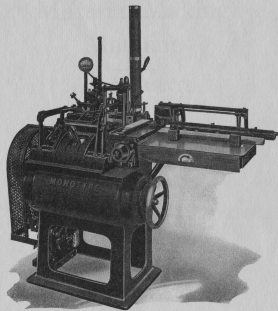


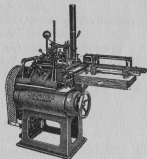
Monotype
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ADJUSTMENTS



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ADJUSTMENTS

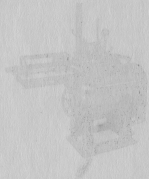


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Monotype

MATERIAL MAKING MACHINE

Adjustments

GENERAL DESCRIPTION

As its name indicates, the **MONOTYPE MATERIAL MAKING MACHINE** casts all material used for make-up. Its products include leads, slugs, rules, column rules, borders, tie-up slugs, and electrotypes bearers, all either in strips or cut to labor-saving measures, and single column leads, slugs, rules, logotypes, and cut-off dashes—in fact, any and all continuous strip material in any desired length, and non-fused material in single casts up to 15 picas long.

The parts or units on this **MACHINE** consist of a **MOLD HOLDER** through which water circulates for cooling the product and in which is a **MOLD CLOSURE** which alternately opens and closes the opening through which molten metal is injected into the **MOLD**; a **MOLD** in which the body of the product is cast; a **MATRIX** in which the face of the product is cast; a **BRIDGE MECHANISM** for raising and lowering the **MATRIX**; a **MOLD BLADE OPERATING MECHANISM**; **MICROMETER WEDGES** for exact determination of stroke; **GEAR SHIFT** and two-step **PULLEY** for change of speed; a **MELTING POT** and **PUMP MECHANISM** for melting metal and injecting this molten metal into the **MOLD**; an **AUTOMATIC CUTTER** for cutting and stacking the continuous strip material; a **STACKER** for automatically stacking the column-width non-fused material; and the necessary **CAMS**, **LEVERS**, **BELL CRANKS**, and other parts for transmitting the power and motion from the driving motor to the various operating parts of the **MACHINE**.

The **Mold Unit** (Fig. 23) forms the chamber in which the product is cast. It consists of two TYPE BLOCKS with two POINT BLOCKS (one at either end) to separate these TYPE BLOCKS, and a MOLD BLADE which operates between the TYPE BLOCKS and beneath the left POINT BLOCK. The TYPE BLOCKS and POINT BLOCKS are fastened together by screws, but the MOLD BLADE is loose and special care must be taken not to drop it out.

The TYPE BLOCKS have an opening in the middle of their upper side (between the POINT BLOCKS) in which the MATRIX in its CARRIER is placed. To produce type-high material a MATRIX with a face driven in it is used, while for low material a BLANK MATRIX is used. MOLDS for casting low material (leads or slugs) of any height from .743" to .876" can be furnished, but, in general, only those for casting leads or slugs .888" or .853" high, that is, .030" or .065" below type-high can be used for casting the standard type-high material. There are some exceptions to this, such as special MOLDS .903" high, used with .015" drive MATRIX for casting classified ad rules. Only one point size and height of leads or slugs can be cast from a given MOLD.

The range of point sizes is from 1 point to 18 point for leads and slugs, from 1½ point to 18 point for strip rules, and from 2 point to 18 point for strip design border. Only one point size and height can be cast from a given MOLD UNIT. MOLDS from 4 point to 12 point inclusive, produce either fusion or non-fusion from the same MOLD. The 1-point MOLD is made for fusion only. In 1½-, 2-, and 3-point sizes a different MOLD is required for fusion from that used for non-fusion. The 1½-, 2-, and 3-point non-fusion MOLDS and all larger point size MOLDS are symbolized NR, the 1-, 1½-, 2-, and 3-point MOLDS for fusion are symbolized NR2F. Modifications of the Standard MOLDS, such as TIE-UP SLUG MOLDS (symbolized NRA), FLUSH SIDE

MOLDS (symbolized NRB), MOLDS equipped with trimmers (NR2G), and MOLDS with trimmers for casting from slug machine matrices (NRG), can be furnished.

The **Mold Holder** (Fig. 23) remains permanently on the MACHINE and in it is clamped the required MOLD UNIT for the product to be cast. The water for cooling the MOLD circulates through each of the two main BLOCKS (BOLSTERS) of the MOLD HOLDER, but does not pass from one BLOCK to the other; there is, therefore, no possible chance for water leaking into the MOLD. The MOLD is positioned in the MOLD HOLDER by its POINT BLOCKS contacting against two GAGE PLATES. The MATRIX GUIDES, which are part of the MOLD HOLDER, are positioned by contacting against the POINT BLOCKS of the MOLD. Thus the MATRIX and MOLD will always line with each other and with the proper line of travel of the product.

In the base of the MOLD HOLDER is the MOLD CLOSURE, a slide which acts to alternately open and close the opening through which the molten metal is forced into the MOLD. The MOLD CLOSURE opens just in time for the PUMP stroke and closes again just as the PUMP is completing its stroke and thus insures a full solid cast in the MOLD. The distance the MOLD CLOSURE opens and the position of this opening can be regulated to suit the material being cast. The MOLD CLOSURE closes against the STOP PLATE which in turn is positioned by a GRADUATED WEDGE between it and its ABUTMENT. The ABUTMENT can be turned to either of two positions, depending on the point size of the MOLD as explained later.

The **Matrix** (Fig. 28 and 29) closes the top of the MOLD opening. It is carried by the BRIDGE MECHANISM (Fig. 21) and may be held permanently in contact with the MOLD for leads, slugs and straight-line rules or raised and lowered at each stroke for other material such as decorative borders and cut-off dashes.

For casting low material, such as leads and slugs, a **BLANK MATRIX** is used, while for face material a **DRIVEN MATRIX** is required. There are four general styles of **MATRICES** for face material: First, for a non-fusion column-width product on which the face is cast the same length as the body; Second, for a non-fusion column-width product on which the face is shorter than the body, such as cut-off dashes; Third, for continuous strip rules and decorative borders; Fourth, for flush-to-side material requiring also a special flush-side **MOLD**.

MATRICES are made and symbolized for the smallest point-size body on which they can be cast, but the same **MATRIX** can be used on any larger point size body and the face will be the same distance from the side of the body as it is on the smaller point size. That is, a face near the side of the body on a 2-point **MATRIX** can be used for casting the same face the same distance from the side of the body on 6- or 12-point body or any body larger than 2 point. **MATRICES** for flush-side material are an exception to the above, because they can be used only on a **MOLD** of the same point size as the **MATRIX**.

The **Bridge Mechanism** (Fig. 21) consists of a tripod with a **TOGGLE LINK** from which is suspended the **MATRIX**. The **TOGGLE LINK** is operated by a **CAM LEVER** acting through a **SPRING** and may, at the will of the operator, raise and lower the **MATRIX** at each stroke or hold it permanently on the **MOLD** under spring pressure.

The **Micrometer Wedges** (Fig. 17) are used to obtain the exact desired length of stroke of the **MOLD BLADE**. They act as an abutment for the **MOLD-BLADE OPERATING BAR** at each end of its stroke. When changing stroke it is necessary to get the approximate length of stroke, as shown by the movement of the zero reference line on **OPERATING ROD 2** in relation to **SCALE 3** (Fig. 22), before making the fine adjustment with the

MICROMETER WEDGES. The **BELL CRANK** (Fig. 18), operating the **MOLD-BLADE OPERATING BAR**, has holes in its rear arm for different lengths of non-fusion and for different lengths of fusion. The **STUD** connecting this **BELL CRANK** with the **SPRING BOX** from the **CAM LEVER** is to be placed in the hole in this **BELL CRANK** corresponding to the desired length of stroke of product. Then the exact length of stroke is obtained by the **MICROMETER WEDGES** (Fig. 17).

Change of Speed is obtained by a four-position **GEAR SHIFT** and two-step **PULLEYS** on the **MOTOR** and on the **MACHINE**. The **GEAR SHIFT** gives four speeds for each step of the **CONE PULLEY** or a total of eight speeds for the **MACHINE**. These speeds give a wide range so that the maximum can be obtained from each size and style of product.

The **Melting Pot** (Fig. 2) and **Pump** (Fig. 10) supply molten metal which is forced into the **MOLD** at each revolution of the **MACHINE** as long as the **PUMP CONTROL HANDLE 38** (Fig. 5) at the front of the **MACHINE** is thrown up. When this **HANDLE** is thrown down, by a touch of the operator, casting will immediately stop.

The **Automatic Cutter** (Figs. 11 to 16) will cut continuous strip material in any length up to 25". It will also stack all lengths from 25" down to about 11 picas (the narrowest newspaper column width). Shorter measures can be cut but may not stack on this **CUTTER** (see **Non-fusion STACKER**). A **PLATE** which may be raised and lowered by two **SET-SCREWS** provides adjustment for insuring straight product. The floating **SHEAR** has a long stroke to take care of the long cast which can be obtained on this machine.

The **Non-fusion Stacker** (Fig. 16) handles all non-fused product, column-width and narrower, stacking it in a special **CHANNEL** toward the front of the **MACHINE**. It is provided with a **SHEAR BLADE** for doing the stack-

ing so that if there is slight fusion or imperfect delivery, as in trial setting of the STACKER, the product will be sheared and delivered into the STACKER without injury to the parts. The STACKER is put into operation by the shift of a LEVER and to change back to continuous strip it is necessary only to shift this LEVER, move the STACKER BAR forward far enough to clear the product, and remove the STACKER MECHANISM by taking off a NUT and WASHER.

The **Cams** through which the power is transmitted to the various parts of the MACHINE, run in oil and require no attention other than keeping sufficient oil in the CASE and cleaning it out about once a year or oftener if it is found to require it. Filter the oil and return it to the CASE with enough more to bring the level up so it can just be seen in the sight feed ELBOW on the front of the CASE. Do not fill to the top of the ELBOW or oil will wave over when the MACHINE is run.

The **Electrical Equipment** regularly furnished consists of a four pole SNAP SWITCH with a FUSE BOX. These are suited to constant speed half horse motor of any style. The FUSE BOX is located inside the BASE in the rear right corner and is wired to the SNAP SWITCH through flexible CONDUIT. The SNAP SWITCH is located on the front of the MACHINE in the most convenient place for the operator. Wires in flexible CONDUIT are run from the SNAP SWITCH to the location for the motor. A wood BLOCK BASE for mounting the motor is provided in the left-hand opening in the BASE itself. The pulley sizes are suited to the half horse motor which we supply on order, having a speed of 1150 R.P.M. (see Figs. 34 and 35).

NOZZLES

(See Fig. 27)

All NOZZLES for use on the MATERIAL MAKING MACHINE are "fluted," that is, looking at the top of the NOZZLE the shape would be like a plus sign with the horizontal line heavier than the vertical line (+). This broad land on the top of the NOZZLE must come in line with the travel of the product. For this purpose all NOZZLES have a double thread, one to screw into the PUMP BODY and the other on which is placed a LOCK NUT for locking the NOZZLE in position with the broad land parallel to the line of travel of the product.

The following is a list of the NOZZLES used for the various kinds of product. The first five are regularly furnished as part of the standard MACHINE equipment, the other NOZZLES are special.

- No. 50 (single hole) used on 2-point fusion and non-fusion.
- No. 47 (single hole) used where the No. 50 hole is not satisfactory on account of sluggish metal.
- No. 43 (single hole) offset used on all 6-point material with the hole offset toward the rear, and on all 12-point with the hole offset toward the front.
- No. 7 (3 hole) used on 6-point fusion face where a No. 43 hole offset does not give good results on face. The center hole is to be toward the rear.
- No. 8 (3 hole) used on 12-point fusion face where the No. 43 hole offset does not give good results on face. The center hole is to be toward the rear.

No. 4 (2 hole) used with small point size fusion MOLDS having the casting end of the BLADE curved at both top and bottom, such as 2NR2F MOLDS. MOLDS of this kind are used for casting decorative faces, such as wave-line, and a 6-pica stroke is required for these decorative borders.

No. 5 (3 hole) used on corner piece and other column-width face material.

No. 9 (3 hole) for use with Logotype Attachment (see page 82).

No. 31 (single hole) offset toward the front for 18-point. (See "Eighteen Point Attachment," page 83.)

For each different product use the NOZZLE which experience shows will give the best results. Start with the "SUGGESTED NOZZLE" shown in the TABLE on page 93 for each product, but if that does not give satisfactory results try the others until the best for the metal and other conditions in the plant is found. Then record this on the "Ready Reference Card" and use it each time for that product.

DRILLING THE NOZZLE

All NOZZLES should be drilled out from the bottom daily. The single hole NOZZLES should also be drilled from the top. The multiple hole NOZZLES should not be drilled from the top, as this part of the passage is very short and does not clog up with dross. Attempting to drill these NOZZLES from the top will damage them so that they will not properly perform their function.

The number on all single hole NOZZLES refers to the size of the drill to be used when drilling the NOZZLE from the top. The TABLE at top of opposite page gives the necessary information for drilling each NOZZLE.

Nozzle Number	Symbol	Distance Drilled up from Bottom*	Distance Left at Top	Drill Used from Top	Number of Holes in Top
50	c14H10	2 $\frac{1}{32}$ "	$\frac{3}{16}$ "	No. 50	1
47	c14H21	2 $\frac{3}{32}$ "	$\frac{3}{16}$ "	No. 47	1
43	d14H22	2 $\frac{1}{32}$ "	$\frac{1}{16}$ "	No. 43	1
7	c14H23	2 $\frac{1}{4}$ "	$\frac{5}{32}$ "	†	3
8	c14H24	2 $\frac{1}{4}$ "	$\frac{5}{32}$ "	†	3
4	c14H19	2 $\frac{1}{4}$ "	$\frac{5}{32}$ "	†	2
5	c14H17	2 $\frac{3}{32}$ "	$\frac{1}{8}$ "	†	3
9	c14H27	2 $\frac{3}{32}$ "	$\frac{1}{8}$ "	†	3
31	d14H13	2 $\frac{1}{32}$ "	$\frac{1}{16}$ "	No. 31	1

*Use No. 16 drill for drilling from the bottom in all NOZZLES. Overall length of all NOZZLES is 2 13/16".

†Do not drill multiple hole NOZZLES from the top—the holes in the top can be cleaned with a small wire like a paper clip after the Nozzle is drilled from the bottom.

DRESSING THE NOZZLE

All NOZZLES are dressed to a gage before leaving our factory. Each NOZZLE should, however, be dressed to exactly suit the NOZZLE SEAT on the MACHINE with which the NOZZLE is to be used. Having been so dressed, the NOZZLE should be used exclusively on this MACHINE and not exchanged with the NOZZLES of any other MATERIAL MAKING MACHINE. To fit the NOZZLE proceed as follows: these directions apply not only to the fitting of a new NOZZLE but also to the fitting of an old NOZZLE when a new NOZZLE SEAT is applied and to the refitting of a NOZZLE which has become damaged on the tip.

Remove both MATRIX GUIDES 7 and 27 (Fig. 23), the front BOLSTER 34, the MOLD (complete), the MOLD CLOSURE 25, the MOLD-CLOSURE-STOP-PLATE WEDGE

41 (Fig. 21), and push the MOLD-CLOSURE STOP PLATE 48 back so that it clears the opening in the NOZZLE SEAT 43. The MOLD-CLOSURE GUIDE PLATES 20 and 30 (Fig. 23), are to be left in position and clamped down by the rear BOLSTER 3; this also holds down the NOZZLE SEAT. With the PISTON removed and the PUMP thrown in, turn the MACHINE until the NOZZLE seats. Notice whether the NOZZLE exactly fits its SEAT. The NOZZLE should be just flush with the top of the NOZZLE SEAT. If it is not correct, the NOZZLE should be removed and dressed with a fine file to bring it as described. This should be done only by an experienced man and great care must be used to keep the end exactly square with the axis of the NOZZLE. Test the fitting by seeing that both the MOLD-CLOSURE STOP PLATE and the MOLD CLOSURE can be pushed into position by hand after the NOZZLE is seated, without either of them touching the tip of the NOZZLE.

ADJUSTMENTS

Starting with a MACHINE on which there is a MOLD and MATRIX in position, the following pages will describe the regular steps of removing the same together with the GUIDE PLATES, CLOSURE, STOP PLATE, WEDGE, ABUTMENT and NOZZLE SEAT and then reassembling them in their proper places. When the MACHINE during this reassembly comes to the proper setting for an adjustment, the adjustment will be described and should be made in its regular order. When all are completed the MACHINE will be fully adjusted, with the MOLD in place together with the MATRIX ready to produce the material selected.

MOLD

The following instructions cover a complete change of MOLDS from one point size to another. When a MOLD is removed for cleaning and the same MOLD is replaced on the MACHINE less parts are removed as will be explained in notes in these directions.

Caution: When making any change or adjustment requiring the loosening of either BOLSTERS 3 or 34 (Fig. 23), or any of their BOLTS, be sure to first back off the ADJUSTING SCREW 35 so that when the BOLTS are tightened again the BOLSTERS will not be held out of position by the CLAMP PIN behind the ADJUSTING SCREW.

To prevent dirt getting in the threaded holes in the MOLD BASE when the vertical BOLTS are removed in case of a squirt the rivet-shaped COVERS 6 (Fig. 11), four of which are furnished, are used to cover the BOLT holes.

If the MACHINE has been running with the MATRIX held constantly on the MOLD it will be necessary to put the front BALL SOCKET 12 and NUT 9 (Fig. 21) on the front end of the TOGGLE-LINK OPERATING ROD 10. Turn the MACHINE until the MATRIX-CARRIER CAM LEVER 15 (Fig. 21) is at the front of its stroke so that the MATRIX is lifted and the pressure is taken off the TOGGLE. Take out the TOGGLE PIN 38.

It is optional whether to loosen the CLAMP SCREW 14 and lift out the BALL EXTENSION 13, thus removing out of the way completely the TOGGLE-LINK OPERATING ROD assembly to give more room for getting at the parts of the MOLD, or whether to simply swing the rear end of the TOGGLE-LINK OPERATING ROD 10 to one side and permit it to remain on the MACHINE.

Lift out the lower TOGGLE LINK 39 (Fig. 21) with the MATRIX CARRIER 47 and the MATRIX 46. Be very careful not to drop the MATRIX out of the MATRIX CARRIER as it slides freely and will slip out of the CARRIER and be damaged if care is not taken to prevent this as it is lifted out of its GUIDES. This MATRIX CARRIER gets very hot when casting.

Turn off the water which has been permitted to run up to this time in order to cool the MOLD parts sufficiently for handling. In turning off the water it is better to close the one main SUPPLY VALVE and leave the two WATER COCKS 15 (Fig. 25) alone so that the water will be adjusted the same when turned on again.

Remove the MOLD-BLADE-COUPLING SCREW 15 (Fig. 23) and the COUPLING 14 entirely. Do not loosen them enough to free the BLADE 13 and then permit them to remain on the MACHINE, as they might cause damage to the parts if the MACHINE were turned over with them hanging loose.

NOTE: When a MOLD UNIT is removed for cleaning and the same MOLD UNIT is to be replaced, it will not be necessary to remove all the parts described in the following directions; instead, only the front BOLSTER 34 (Fig. 23), MATRIX GUIDES 7 and 27, and the THRUST BARS 5 and 23 need be removed, and only the ELBOW NUT 42, on the front BOLSTER 34, disconnected.

Caution: The CLOSURE-CAM LEVER 24 (Fig. 21) must be all the way to the front.

When one MOLD is removed and another MOLD is put on, even though it be of the same point size, the complete instructions are to be used as follows:

Loosen the ADJUSTING SCREW 35 (Fig. 23) and take the remaining product out of the MOLD. Disconnect the two ELBOW NUTS, 11 and 42 on the SUPPLY PIPES only. The DISCHARGE PIPES remain on the BOLSTER BLOCKS.

Turn the MACHINE till the CLOSURE-CAM LEVER 24 (Fig. 21) is all the way to the front.

Loosen NUTS 18 and 29 (Fig. 23), SCREWS 28 in the front BOLSTER 34 and the four SCREWS 10. Lift off both THRUST BARS 5 and 23. Take out all the BOLTS and SCREWS that were loosened. Push the MOLD BLADE 13 into the MOLD so that the left end is nearly flush.

Remove the MATRIX GUIDES 27 and 7 (Fig. 23). Remove the front BOLSTER 34 and drain the water out of it. Remove the MOLD UNIT 32 complete, wipe it off and put it in its compartment in the DRAWER of the MACHINE together with a short piece of the product from this MOLD UNIT for use in starting it the next time.

Loosen the SCREWS 28 (Fig. 23) in the rear BOLSTER 3. Clean the MOLD-CLOSURE GUIDE PLATES 20 and 30, the front face of the rear BOLSTER 3 and the corner between these parts, being very careful to remove all particles of metal. The edge of a piece of slug makes a good scraper for this and does not injure the parts.

NOTE: After a long run or if the next run is to be long it is well to take out the MOLD-CLOSURE-SHOE SCREWS 26, lift off the SHOE 24, take out the MOLD CLOSURE 25 and clean it and its slot.

Caution: The CLOSURE-CAM LEVER 24 (Fig. 21) must be all the way to the front.

MOLD-HOLDER BASE PLATE ASSEMBLY

GENERAL CLEANING

If the MOLD-HOLDER BASE PLATE ASSEMBLY requires a general cleaning, as when trouble has been experienced, proceed as follows, but if it is a simple change of MOLDS, skip the following and begin again at "CHANGING OF MOLDS," page 18.

Remove the rear SCREWS 28 (Fig. 23) and take off the rear BOLSTER 3 and drain the water from it.

Loosen the two CLAMP SCREWS 10 (Fig. 24). Remove the left GUIDE PLATE 20 (Fig. 23). Take out the MOLD-CLOSURE STOP PLATE 8 (Fig. 24) and its WEDGE 7. Remove the MOLD-CLOSURE-SHOE SCREWS 26 (Fig. 23) and SHOE 24 and take out the CLOSURE 25. Carefully lift the right GUIDE PLATE 30 off. Remove the NOZZLE SEAT 43 (Fig. 21) and STOP PLATE ABUTMENT 6 (Fig. 24).

Clean the NOZZLE SEAT 43 (Fig. 21), BASE PLATE 38 (Fig. 23), GUIDE PLATES 20 and 30, MOLD-CLOSURE STOP PLATE 8 (Fig. 24), STOP-PLATE WEDGE 7 and MOLD CLOSURE 25 (Fig. 23).

Remove the PISTON 4 and NOZZLE 1 from the PUMP BODY 5 (Fig. 10). The MACHINE is now in proper position to make the NOZZLE adjustments.

NOZZLE ADJUSTMENTS

Two Adjustments

First: To insure that the axis of the NOZZLE is in a vertical position.

Second: To center the NOZZLE in the NOZZLE SEAT.

First

Object: That the axis of the NOZZLE when entered in the MOLD OPENING will be perpendicular to the MOLD, so that there will be a tight joint between the MOLD and the NOZZLE.

PRELIMINARY

The MOLD, MATRIX GUIDES, BOLSTERS, CLOSURE, CLOSURE STOP PLATE, CLOSURE GUIDE PLATES, NOZZLE SEAT, PUMP PISTON, and NOZZLE have just been

removed. Loosen the three POT CASING SCREWS 24 on the bottom of the SWING FRAME TABLE 9 (Fig. 2).

Raise the MELTING POT into position and with the PUMP TRIP HANDLE 38 (Fig. 5) released, turn the MACHINE to bring the PUMP up to casting position.

Screw the NOZZLE SQUARING PIN 1 (Fig. 1) into the PUMP in place of the NOZZLE 3 (Fig. 2).

Caution: See that the PIN is first heated on the thread end, then started squarely in the PUMP and screwed down until its shoulder is seated.

PROCEDURE

Loosen the CLAMP SCREW 18 and turn the ADJUSTING PIN 19 until the PIN 1 (Fig. 1) is square with the top of the MOLD BASE PLATE 38 (Fig. 23). Test this to front and rear with a square resting on the top surface of the MOLD BASE PLATE. Tighten the CLAMP SCREW 18 (Fig. 2) and test again with the square to see that the adjustment holds.

NOTE: The PIN (Fig. 1) will stand square to right and left unless the PUMP BODY 5 (Fig. 10) or its LIFTING LEVER 17 (Fig. 2) is badly worn, in which case the worn parts should be replaced.

Remove the SQUARING PIN 1 (Fig. 1).

Second

Object: That the NOZZLE will enter the conical hole in the NOZZLE SEAT without dragging on the side of the cone.

PRELIMINARY

Screw NOZZLE in place. Replace NOZZLE SEAT 43 (Fig. 21).

Caution: See that the PUMP PISTON 4 (Fig. 10) is removed to avoid any possibility of a "s squirt" of hot metal.

Place a packing between the top OPERATING-ROD NUT 2 (Fig. 3) and the OPERATING-ROD LEVER 3, so that when the PUMP is raised, the NOZZLE will stand about $\frac{1}{16}$ " below its position for contact with the MOLD. Raise the MELTING POT into position. With the PUMP TRIP 38 (Fig. 5) released, slowly turn the MACHINE to casting position, noting the travel of the NOZZLE on its up-stroke.

PROCEDURE

By moving the PUMP on its supports inside the POT to the right and left, and to the front and rear, the NOZZLE can be seen to move slightly from one side or the other of the conical hole in the NOZZLE SEAT. The position of the POT must be adjusted so that this slight movement of the NOZZLE is equal in all four directions from the center of the conical hole in the NOZZLE SEAT.

To move the NOZZLE to the front or rear, turn the ADJUSTING SCREW 21 (Fig. 2) in the required direction.

To move the NOZZLE to the right or left, turn the ADJUSTING SCREW 8 in the required direction. (Lower the MELTING POT to reach the SCREW 8.)

Remove the PACKING PIECE from between NUT 2 (Fig. 3) and LEVER 3.

Tighten the CASING SCREWS 24 (Fig. 2).

All multiple hole NOZZLES, Nos. 4, 5, 7 and 8 (Fig. 27), must line exactly with the path of travel of the MOLD BLADE and with the opening between the MOLD CLOSURE 16 (Fig. 21) and the STOP PLATE 48, when in casting position. The use of the NOZZLE SETTING GAGE X32L is recommended as it insures accuracy and saves time in lining up this style of NOZZLE.

The NOZZLE having been adjusted, return is next made to the assembly of the parts.

MOLD-CLOSURE MECHANISM

The MOLD CLOSURE 16 (Fig. 21) is a sliding PLATE between the upper side of the NOZZLE SEAT and the under side of the MOLD. The CLOSURE opens before the PISTON down-stroke and closes as the PISTON is completing its down-stroke. This closes the bottom of the MOLD opening completely and prevents any possibility of the metal flowing out or being sucked out should the PISTON start on its up-stroke as the NOZZLE is leaving the MOLD. The MOLD CLOSURE is operated by the ROD 22 being pulled forward (opened) by the CAM LEVER 24 and, when released by this CAM LEVER, is closed by the SPRING 18.

The MOLD CLOSURE 16 (Fig. 21) closes against the STOP PLATE 48 which is adjusted by means of the WEDGE 41 which is placed between the STOP PLATE 48 and the ABUTMENT 42. The end of the MOLD CLOSURE and its STOP PLATE where they come together are beveled on the under side with the object of allowing a smooth flow of metal from the NOZZLE through the CLOSURE opening and into the MOLD.

ASSEMBLY

Replace the right MOLD-CLOSURE GUIDE PLATE 30 (Fig. 23) and see that it is down tight and up against the ABUTMENT 36. Replace the STOP-PLATE ABUTMENT 6 (Fig. 24), the MOLD-CLOSURE STOP PLATE 8 with its WEDGE 7 behind it and the left GUIDE PLATE 9, positioning this PLATE so that it lines with the right PLATE and its screw holes match with those in the BASE 20. Tighten the SCREWS 10 in the GUIDE-PLATE CLAMP 11. This makes the opening between the GUIDE PLATES 20 and 30 (Fig. 23) for the MOLD CLOSURE 25 correct in

size. Replace the MOLD CLOSURE 25, sliding it in from the front to clean its slot. Put on the MOLD-CLOSURE SHOE 24 and tighten its two SCREWS 26.

Clean the rear BOLSTER 3 carefully, using the edge of a lead or slug to remove all particles of metal. Be absolutely sure that all particles of metal are removed, for any left on it may change the point size or cause the MOLD BLADE to hang up. Slide this BOLSTER 3 on from the rear to clean the BASE; slide it back and forth a little, after it is positioned, to be sure it is perfectly seated. It can be told by the touch whether it seats correctly. Insert SCREWS 28 and bring them up to a bearing, but not so tight that the BOLSTER cannot be moved easily.

CHANGING MOLDS

If no trouble has been experienced and a simple exchange of MOLDS is to be made, instead of a general cleaning of the parts of the MOLD-HOLDER-BASE-PLATE ASSEMBLY, disregard the directions which have been given under "Mold-holder Base Plate Assembly" (page 13), and proceed as follows:

Take from the drawer the desired MOLD and its piece of product. For the purpose of these instructions, use a two-point MOLD. Clean this MOLD, being especially careful to clean thoroughly the corners each side of both POINT BLOCKS 40 and 41 (Fig. 23) as these are the stops for the MATRIX GUIDE 7 and they cannot well be cleaned after being placed in the assembly.

See that the MOLD BLADE 13 (Fig. 23) is in the MOLD with the number on the BLADE to the front. To prevent damaging the casting end of the MOLD BLADE or the casting surfaces of the MOLD, on two-point and other MOLDS without nick in BLOCK and BLADE, insert the BLADE by entering its top edge into the left hand

lower corner of the MOLD and then swinging the BLADE up into place like closing a jack-knife. On MOLDS having a nick, the BLADE is always inserted straight from the left end.

Put the MOLD in position in front of the REAR BOLSTER 3 (Fig. 23), holding it flatwise (to prevent dropping out the MOLD BLADE) until almost in place and then turning it upright into its operating position. Push it back so that its POINT BLOCKS 40 and 41 come against the GAGE PLATES 2 (Fig. 23) and 4 (Fig. 24). Note that on the smaller point sizes the POINT BLOCKS stop against the front step of these GAGE PLATES while on larger point sizes there is a notch in each POINT BLOCK into which this front step on the GAGE PLATES fits so that the POINT BLOCKS stop against the second step on the GAGE PLATES. Press the MOLD UNIT and the rear BOLSTER 3 (Fig. 23) together with one hand at each end to be sure there is nothing between them holding them apart. Grasp the MOLD and BOLSTER near the middle with one hand, press them together and push them back until the POINT BLOCKS rest properly against the GAGE PLATES 2 (Fig. 23) and 4 (Fig. 24), when the rear SCREWS 28 (Fig. 23) should be brought up to bearing and tightened while still holding the parts as described with one hand. This positions the rear BOLSTER accurately (for this one MOLD only) so that the front assembly can be made against this solidly located BOLSTER. When changing to any other MOLD, even of the same point size, the rear BOLSTER must be relocated in this same manner.

NOTE: MOLD application continued on page 31.

We now have the NOZZLE adjustments made, the GUIDE PLATES and CLOSURE MECHANISM on the MACHINE and the rear BOLSTER in place.

We will next proceed with the adjustment of the MOLD CLOSURE 16, STOP PLATE 48, WEDGE 41 and ABUTMENT 42 (Fig. 21).

MOLD CLOSURE, STOP PLATE, WEDGE, AND ABUTMENT

Three Adjustments

First: Position of ADJUSTING NUT 20 (Fig. 21).

Second: Position of WEDGE 41.

Third: Position of ABUTMENT 42.

Object: To give an opening from the NOZZLE into the MOLD of the size and position best suited to the product to be cast and to the NOZZLES used. All three of these adjustments are to be considered together.

PRELIMINARY

The MOLD CLOSURE 16 (Fig. 21) and its STOP PLATE 48 are to be adjusted by means of the ADJUSTING NUT 20 and WEDGE 41 and ABUTMENT 42 at the time a MOLD is put on the MACHINE. The GRADUATED WEDGE 41 (Fig. 21) behind the STOP PLATE 48 has 40 graduations numbered on every fourth graduation from 0 to 10. When the WEDGE is moved from 0 to 10 it moves the STOP PLATE .050". Therefore a movement of the WEDGE from one number to the next, as from 2 to 3 (that is, four graduations) will move the STOP PLATE .005", while a movement of but one graduation on the WEDGE moves the STOP PLATE .00125". The ADJUSTING NUT 20 on the MOLD-CLOSURE OPERATING ROD 22 moves the MOLD CLOSURE 16 about .001" for each subdivision. The desired point-size MOLD must be placed in position against the rear BOLSTER for this adjustment. For the purpose of these adjustments a 2-point MOLD is used and the casting end of the STOP PLATE 48 (Fig. 21) and the MOLD CLOSURE 16 are set to line with the inside faces of the TYPE BLOCKS of the MOLD.

This makes a CLOSURE opening of 2 points, and in no case should this opening exceed this amount, but quality can be improved at times by closing slightly either the MOLD CLOSURE or the STOP PLATE or both. When the best conditions have been secured, take a reading of the position of the WEDGE 41 and of the GRADUATED NUT 20 and note these readings on the "Ready Reference Card" so that these conditions can be duplicated when again casting 2 point on this MACHINE.

PROCEDURE

The MOLD-CLOSURE-CAM LEVER 24 (Fig. 21) must be at the front end of its stroke and the STOP PLATE 48 must be to the rear, clear of the opening in the MOLD. (Be careful not to turn the MACHINE over while either BOLSTER is off or the CLOSURE will be damaged.) Screw the ADJUSTING NUT 20 onto the OPERATING ROD 22 far enough to draw the MOLD CLOSURE 16 to the front so that its rear end will be in front of the opening in the MOLD. Put a piece of 2-point material down vertically in the MOLD in the opening in which the product is cast, having the lower end of this material pointed to enter the slot between the CLOSURE 16 and STOP PLATE 48. Hold the MOLD back against the rear BOLSTER and unscrew the ADJUSTING NUT 20 on the MOLD-CLOSURE OPERATING ROD 22 until the MOLD CLOSURE 16 just touches the piece of product. Lock the NUTS 20 and 21 and test this setting again to see that it holds. Now remove the MOLD and with the piece of 2-point material between the CLOSURE 16 and its STOP PLATE 48, adjust the STOP PLATE 48 by tapping the tapered WEDGE 41 behind it until the STOP PLATE just touches the 2-point material. The ABUTMENT 42 is to be turned with its thicker side toward the front and the GRADUATED WEDGE 41 is to be inserted from the right with the graduations toward

the STOP PLATE 48 when making this adjustment of the STOP PLATE. This adjustment gives a 2-point opening positioned so that it exactly coincides with the casting cavity in the 2-point MOLD.

NOTE: For CLOSURE setting for larger point sizes see "Casting Other Point Sizes" (page 42).

Clean the seat for the rear MATRIX GUIDE 7 (Fig. 23) in the rear BOLSTER 3, being especially careful to remove all particles of metal with the edge of a lead or slug. See that the corners at the POINT BLOCKS are still clean. In a similar manner clean the front BOLSTER 34 and the front MATRIX GUIDE 27. Place the 2-point MOLD on the MACHINE against the rear BOLSTER 3 and with the POINT BLOCKS 40 and 41 touching the GAGE PLATES 2 (Fig. 23) and 4 (Fig. 24). Put the front BOLSTER 34 (Fig. 23) in position against the front side of the MOLD and put the rear MATRIX GUIDE 7 in position so that the grooves in its ends straddle the projecting ends of the POINT BLOCKS 40 and 41. This positions the rear BOLSTER 3, the MOLD and the front BOLSTER 34, in relation to one another. Put in the two front SCREWS 28 (and Washers) and bring them up to snug bearing while holding the front BOLSTER 34 back against the MOLD UNIT and rear BOLSTER 3. Put in the BOLTS 4 and 19. Put the NUTS 18 (with their WASHERS 17) on the front end of these BOLTS, bring them up to bearing and tighten them lightly. Insert BOLTS 6 and 22 (Fig. 23) and put the NUTS 29 (with their WASHERS 21) on their front ends, leaving room for the two THRUST BARS 5 and 23, which place on these BOLTS. Bring the NUTS 29 up to snug bearing. Remove the rear MATRIX GUIDE 7 and put it in its regular place in the opening in the rear BOLSTER 3, after making sure that both it and its bearings are clean. Insert its two SCREWS 10 (with their WASHERS) and bring them to bearing. With the ADJUSTING SCREW 9 bring the rear MATRIX GUIDE 7 up against the POINT BLOCKS 40 and

41 and tighten the LOCK NUT 8. Caution: This ADJUSTMENT SCREW 9 should not be made so tight that any undue pressure is brought against the POINT BLOCKS or they may be broken—snug bearing is all that is necessary. This rear MATRIX GUIDE 7 being now against the POINT BLOCKS 40 and 41 (which properly position it pointways) fully tighten its two SCREWS 10. Connect all WATER PIPES to the BOLSTERS.

Clean the right end of the MOLD-BLADE OPERATING ROD 2 (Fig. 22). Pull the MOLD BLADE 13 (Fig. 23) out to the left to meet this ROD, and clamp the BLADE to the OPERATING ROD by means of COUPLING 14 and its SCREW 15.

MOLD-BLADE GAGE

It is very necessary that the left end of the body of the material be in line with the left end of the face. To accomplish this the right end of the MOLD BLADE on its stroke to the left must come exactly to the left end of the drive (design) in the MATRIX.

To approximately position the MOLD BLADE in relation to the design in the MATRIX the MOLD-BLADE GAGE 1 (Fig. 29) is used to set the MOLD BLADE before the MATRIX is placed in position.

Before placing the GAGE in position, place it against the MATRIX to be used and see which line on the GAGE coincides with the left end of the drive in the MATRIX; this line on the GAGE is then the one to be used in setting the left end of the stroke of the MOLD BLADE.

When using the GAGE, the front MATRIX GUIDE must be removed and the GAGE set in place of the MATRIX in the rear MATRIX GUIDE over the MOLD BLADE, with the reference marks on the GAGE facing the front.

The word "Fusion" as applied to this GAGE, covers all fused face material including fancy designs which require exact matching of the ends of the product as well as straight-line rule designs which are sometimes designated as "Borders." Exception: Certain faces difficult to cast are made for 4-pica stroke and this GAGE can be used only for setting the position of the right end of the stroke for such MATRICES, the length of stroke is then set to 4 picas by trial, so that the left end of the stroke lines with the left end of the design in the MATRIX.

The line marked "Non-Fusion" in Fig. 29 is used only for the rule MATRICES for non-fused column-width material, which MATRICES have the left end of the drive a little less than $\frac{3}{8}$ " from the left end of the MATRIX.

Caution: Remember that the setting of the stroke by means of this GAGE 1 (Fig. 29) is only approximate and that, especially on decorative border MATRICES, the exact stroke must be determined after casting has started by a careful examination of the product under a glass and this exact stroke then obtained under running conditions by adjusting the MICROMETER WEDGE 10 (Fig. 17).

The method of setting the stroke to this GAGE is described in the following under "Mold-blade Operating Mechanism" (page 25).

MOLD-BLADE OPERATING MECHANISM

MOLD-BLADE BELL CRANK

The left arm of the MOLD-BLADE BELL CRANK 1 (Fig. 18) has seven holes in it which are in two irregular rows. Referring to Fig. 18, holes 1, 3, 6, and 7 form the rear row and are for non-fusion product

(individual piece material), such as cut-off dashes and leads of any length up to column width. Holes 2, 4, and 5 form the front row and are for fusion product (continuous strip material), hole 2 being for fancy borders and straight-line rules and leads, and holes 4 and 5 are for slugs and leads when quantity of output is the most important factor and a stroke longer than 6 picas is used. The different length stroke obtained from each hole is shown in the TABLE (Fig. 18).

MOLD BLADE OPERATING ROD

One Adjustment—Position of stroke.

Object: That the MOLD BLADE at each end of its stroke shall come in proper relation to the design in the MATRIX being used.

PRELIMINARY

Have STUD 3 (Fig. 19) in HOLE 2 (Fig. 18) (second hole from left) of the MOLD-BLADE BELL CRANK 1. This is the position for casting any fusion material with 6-pica stroke. Put the MOLD-BLADE GAGE 1 (Fig. 29) Plate IV in the MATRIX opening in the MOLD with its left end in the left hand corner of the MATRIX GUIDE 7 (Fig. 23).

PROCEDURE

Run the left MICROMETER WEDGE 10 (Fig. 17) (right KNURLED HEAD) down as far as it will go, when the MOLD BLADE is in the left hand position, then give it one turn back and lock it with its LOCK NUT. This correctly positions the BLADE on its right hand stroke for fusion material. Check this by seeing that the right end of the MOLD BLADE stops about $\frac{1}{16}$ " to the right of the CLOSURE. Turn the MACHINE until the BLADE is in the left hand position. Adjust the right MICROMETER

WEDGE 9 by turning the KNURLED HEAD 2 until the end of the MOLD BLADE comes to the left side of the "Fusion" cut in the GAGE 1 (Fig. 29). Lock the SCREW 4 (Fig. 17) with its LOCK NUT 3.

With MOLDS 4 point and larger, that have blades with a square right (casting) end this position can be plainly seen. For MOLDS 3 point and smaller with a curved front end, used for fusion material only, a reading must be taken on the SCALE on STAND 3 (Fig. 22). When the MOLD BLADE is all the way to the right end of its stroke, count back 6 picas and set the MICROMETER WEDGE 9 (Fig. 17), with KNURLED HEAD 2, to bring the BLADE to this point as indicated by the MARK 0 on the MOLD-BLADE OPERATING BAR 2 (Fig. 22). This adjustment is always made while the front MATRIX GUIDE 27 (Fig. 23) is off the MACHINE in order that the movement of the BLADE may be plainly seen.

The adjustment of the SPRING BOX will be given later (page 27) but at this time make sure there is compression in the SPRING BOX at each end of the stroke after this stroke has been set by the GAGE.

Clean thoroughly the front MATRIX GUIDE 27 (Fig. 23), making sure it is free from all particles of metal, and slide it into place in the opening in the front BOLSTER 34. Make sure it has perfect bearing on its seat. Put in the SCREWS 10 (with their WASHERS) and bring them up to bearing.

The MOLD-BLADE GAGE 1 (Fig. 29) is also used to position the MATRIX GUIDES to the correct size opening to suit the MATRICES. Make a temporary setting of the front MATRIX GUIDE at this time, because the MOLD has not yet been fully tightened in place. Put the MOLD-BLADE GAGE between the two MATRIX GUIDES 7 and 27 (Fig. 23). Screw the KNURLED SCREW in against the front MATRIX GUIDE 27 to bring the GUIDE to a light bearing against the GAGE, and slightly tighten the SCREWS 10. Remove the GAGE.

Have the upper TOGGLE LINK 37 (Fig. 21) turned with its SPRING to the rear. Put a MATRIX 46 in the MATRIX CARRIER 47. This should preferably be a BLANK MATRIX, but if a rule or border MATRIX is used, have its open end to the right. Be sure this MATRIX is clean as well as its CARRIER. Slide the MATRIX and its CARRIER into position between the two MATRIX GUIDES 7 and 27 (Fig. 23). Put on the TOGGLE LINK OPERATING ROD (complete) 10 (Fig. 21), putting the BALL EXTENSION 13 (Fig. 21) in the end of the CAM LEVER 15 and tightening the CLAMP SCREW 14 on the CAM LEVER to hold it. Be sure the SPRING on the upper TOGGLE LINK 37 is to the rear and put in the PIN 38 connecting the upper and lower TOGGLE LINKS 37 and 39 to the OPERATING-ROD EYE 1.

MOLD-BLADE SPRING BOX

One adjustment—to avoid any lost motion.

PRELIMINARY

With MACHINE in rest position (no compression on SPRING BOX), loosen LOCK NUT 8 (Fig. 19) and ADJUSTING NUT 9.

PROCEDURE

Bring ADJUSTING NUT 9 (Fig. 19) just to bearing so the ROD 7 will have no shake in the SPRING BOX. Lock it with LOCK NUT 8.

Test to see that the adjustment holds and that there is no lost motion inside the SPRING BOX. The NUT 9 must not be screwed up so tight as to prevent the SPRING ABUTMENTS inside the Box from touching the ends of the Box, for the SPRING inside the Box must have no lost motion, but be in position to compress as soon as the ROD 7 moves in either direction relative to the SPRING BOX.

Turn the MACHINE until the MOLD BLADE is all the way to the right and note the compression on the SPRING BOX ROD 7 (Fig. 19), then turn the MACHINE until the MOLD BLADE is all the way to the left. Note if the compression is equal in each movement. If not, release LOCK NUT 6 and with a wrench applied to NUTS 8 or 9 equalize this compression by screwing the ROD 7 in or out of the SOCKET 5. After the compression is equal, lock the LOCK NUT 6.

MATRIX OPERATING MECHANISM

MATRIX-CARRIER-TOGGLE-LINK SUPPORTING ROD

One adjustment—freedom.

Object: To insure that the MATRIX will seat squarely on the MOLD. If the SUPPORTING ROD 28 (Fig. 21) is not free, it will hold the TOGGLE LINK rigidly and may prevent the MATRIX seating properly.

PROCEDURE

Adjust the ADJUSTING NUT 30 (Fig. 21) and lock it with its LOCK NUT 29 so that ROD 28 is just free in SLEEVE 31 and can be easily turned with the fingers. There should be practically no up and down play—not over a few thousandths of an inch at the most.

MATRIX-CARRIER TOGGLE LINK

One adjustment—position.

PRELIMINARY

With the MOLD in place and MATRIX 46 (Fig. 21) in the MATRIX CARRIER 47, turn the MACHINE until the MATRIX 46 is seated on the MOLD, and the MATRIX-CARRIER-TOGGLE-LINK OPERATING ROD 10 is at the extreme end of its movement to the rear.

In this position the TOGGLE LINK 37-39 (Fig. 21) at its center 38 must be "out of line" toward the **front** of the MACHINE and the SPRING 6 on the OPERATING ROD 10 must be in compression. If the TOGGLE LINK is not "out of line" but hangs straight down, turn the MACHINE until the MATRIX is lifted from the MOLD, then the SUPPORTING ROD 28 must be lowered by loosening the LOCK NUT 32 and turning down the SLEEVE 31 until the TOGGLE LINK is "out of line" toward the **front** of the MACHINE and the SPRING is in compression.

This adjustment must be made each time a MOLD is put on of different height from that being taken off the MACHINE. It is well to form the habit of noting whether this setting is correct before starting up after making any change of MOLD or MATRIX.

PROCEDURE

Turn the SLEEVE 31 (Fig. 21) until the center PIN 38 is $\frac{1}{16}$ " out of line with the two PINS 35 and 40. This center PIN 38 must be "out of line" toward the **front** of the MACHINE. It must not be allowed under any circumstances to be "out of line" toward the rear of the MACHINE as this would mean there was no SPRING compression on the MATRIX. Tighten the LOCK NUT 32 and test to see that the adjustment holds.

MATRIX-CARRIER-TOGGLE-LINK OPERATING ROD

Two Adjustments

First: Length of ROD when MATRIX is to be raised each stroke.

Second: Length of ROD when MATRIX is not to be raised at all.

First

Object: To raise the MATRIX high enough to clear the product for fancy borders, cut-off dashes, and similar product.

PRELIMINARY

Back off the NUTS 9 and 11 (Fig. 21) and turn the MACHINE until the MATRIX 46 is seated on the MOLD under compression of SPRING 6. Have the GUARD 49 between the NUTS 9 and 10.

PROCEDURE

Adjust the NUT 9 (Fig. 21) and lock it with NUT 11 against GUARD 49 so that when LEVER 15 is at the front end of its stroke the MATRIX 46 will be raised off the MOLD far enough to clear the product. MATRICES of .030" depth of drive should be raised about $\frac{1}{16}$ ". MATRICES of .065" depth of drive should be raised about $\frac{8}{32}$ ".

Caution: This GUARD 49 (Fig. 21) must always be in position when the MACHINE is operating on material that requires the raising of the MATRIX. Injury to the operator may result if it is omitted.

Second

Object: To hold the MATRIX constantly on the MOLD when casting straight-line rules or leads and slugs, either fused or non-fused.

PRELIMINARY

Have a MATRIX in the CARRIER 47 (Fig. 21) that does not require lifting from the MOLD, for example, a straight-line rule or BLANK MATRIX.

PROCEDURE

Remove entirely the two NUTS 7 and 9 (Fig. 21), the front BALL SOCKET 12, and the GUARD 49.

MOLD APPLICATION

(Continued from page 19)

Turn the MACHINE to put the SPRING load of the OPERATING ROD SPRING 6 (Fig. 21) on the MATRIX. This holds the MOLD UNIT down firmly. With the MACHINE turned so that the MATRIX is seated under the SPRING pressure of the TOGGLE-LINK-OPERATING-ROD SPRING 6, tap with a pig of type metal the top of the ROD 28 (where it projects from the NUT 31) to besure the MATRIX and MOLD are down tight. Then tighten two NUTS 29 (Fig. 23) beginning at the left, continuing to the two NUTS 18 and the four SCREWS 28. Tighten each in turn a little at a time until all are fully tight.

Replace the BALL SOCKET 12 and NUT 9 (Fig. 21) on the ROD 10 and remove the TOGGLE LINK MECHANISM and MATRIX. Insert the GAGE 1 (Fig. 29). Tighten the ADJUSTING SCREW 43 (Fig. 23) to move the MATRIX GUIDE 27 back against the GAGE, loosening the SCREWS 10 in GUIDE 27 if necessary. Slightly tighten SCREWS 10 and try the GAGE to see that it moves up and down freely, but without shake on either end. Fully tighten SCREWS 10 and see that this has not changed the fit of the GAGE. Tighten LOCK NUT 44. Replace the TOGGLE-LINK MECHANISM and the MATRIX. Remove NUT 9 (Fig. 21) and the front BALL SOCKET 12. Take a piece of the product like the material to be cast, and (the ADJUSTING SCREW 35 (Fig. 23) being backed off) push this piece of product into the MOLD from the right. Turn the MACHINE over and note that the BLADE pushes the product a little to the right showing that it has been inserted far enough into the MOLD to touch the BLADE. Tighten the ADJUSTING SCREW 35 enough to prevent the product being blown out by the stroke of the PISTON but not enough to cause the MOLD BLADE to hang up.

PUMP MECHANISM ADJUSTMENTS

CONNECTING ROD

One Adjustment—length of ROD 27 (Fig. 5).

Object: That the CROSSHEAD 14 (Fig. 4) shall not hammer on its ABUTMENT on the MAIN STAND 15.

PRELIMINARY

The PUMP PISTON 1 (Fig. 6) should be in place during this adjustment. Back off the two NUTS 11 and 12 (Fig. 4) so that they cannot come against the CASTING 10 during this adjustment. Loosen NUT 48 (Fig. 5) and run down the STOP 43.

PROCEDURE

With the PUMP HANDLE 38 (Fig. 5) thrown in, as shown in Fig. 5, and the MACHINE at rest; that is, when the top of the PUMP-OPERATING-CAM LEVER 40 is all the way to the rear and there is no compression on the MOLD BLADE SPRING BOX (Fig. 20) make the length of ROD 27 (Fig. 5) such that the CROSSHEAD 14 (Fig. 4) will clear its ABUTMENT 15 by $\frac{3}{16}$ ". Be sure to test this clearance after both LOCK NUTS 28 and 33 (Fig. 5) on ROD 27 are tightened.

After making this adjustment, and the ROD 27 (Fig. 5) is locked with its LOCK NUTS 28 and 33 on each end, swing the HANDLE 38 up and down a few times to make sure it enters properly the square hole in the SPRING CLIP 35. If it does not enter this square hole properly, loosen the LOCK NUT 33 and tighten it again after moving the SPRING CLIP 35 in the desired direction to bring its hole in line with the HANDLE.

PISTON

Two Adjustments

First: Position of STOP 43 (Fig. 5).

Second: Position of STOP NUT 25.

Both of these adjustments must be considered together.

Object: That the PISTON may be clamped tightly against its lower STOP PLATE 4 (Fig. 6) at all times except when the NOZZLE is in contact with the MOLD.

PRELIMINARY

With the MACHINE in the position of rest back off the two NUTS 25 and 26 (Fig. 5). Loosen LOCK NUT 48 and screw down the STOP 43 unless this has already been done as required in the preceding adjustment. When this is done, note that the PISTON 1 (Fig. 6) is locked against its UP-STOP 4 and that the LATCH 16 (Fig. 7) has clearance below it. The PUMP-LATCH HANDLE 38 (Fig. 5) is to be thrown into operating position as shown.

PROCEDURE

Screw up the STOP 43 (Fig. 5) until it just touches the CROSSHEAD 45 and then screw it up one-half turn further. At this point the PIN 6 (Fig. 6) will stand central in the hole in the PISTON LEVER 7. This is indicated by the fact that the PIN 6 may be revolved freely with the fingers. Tighten the NUT 48 (Fig. 5) and see that the adjustment holds.

With the fingers, screw up the NUT 11 (Fig. 4) just to bearing against the CASTING 10, then hold NUT 11 and tighten LOCK NUT 12 against it.

LATCH

One Adjustment—To clear its ABUTMENT PLATE 19 (Fig. 7).

Object: That the LATCH PLATE 18 shall clear the ABUTMENT PLATE 19 when the PISTON 1 (Fig. 6) is at the top of its stroke.

PROCEDURE

When the MACHINE is in the position of rest, adjust the NUT 14 (Fig. 7) and lock it with LOCK NUT 13 to give $\frac{3}{16}$ " clearance between the LATCH PLATE 18 and its ABUTMENT PLATE 19.

PUMP-BODY OPERATING ROD

Two Adjustments—Position of PUMP-BODY-OPERATING-ROD LEVER 7 (Fig. 8) and STUD 5.

Object: That the NOZZLE shall be seated before the PISTON starts on its down stroke and be withdrawn early by the action of STUD 5.

PROCEDURE

With the MACHINE at rest, adjust the NUT 6 (Fig. 9) and lock it with its LOCK NUT 5 so that the LEVER 2 will clear the PISTON LEVER 1 by $\frac{1}{16}$ " when the front of the LEVER 2 is swung as far to the left as possible. Hold up the ROD 4 (on which are NUTS 6 and 5) with the fingers in order to take up the lost motion when testing this adjustment.

Swing the GAG PLATES 6 (Fig. 7) into position beneath the LATCH 16 and turn the MACHINE with PUMP engaged until the GAG PLATES 6 come within $\frac{1}{16}$ " of the LATCH 16. In this position adjust the STUD 5 (Fig. 8) so that it just touches LEVER 7. Then back off STUD 5 one-half turn, and lock it with LOCK NUT 6. This gives about $\frac{1}{4}$ " clearance between the lower end of STUD 5 and LEVER 7.

Caution: Be careful not to screw STUD 5 down too far for if this is done, it will prevent the PISTON return-

ing to the top of its stroke, the LATCH PLATE 18 (Fig. 7) will not engage the ABUTMENT PLATE 19 and a "squirt" or other trouble will result. A wrong adjustment of this STUD 5 (Fig. 8) may be easily mistaken for a sticky PISTON. If the PISTON seems to stick, so that it does not rise to the top of its stroke, test first the adjustment of this STUD 5.

In this position with the LEVER 3 (Fig. 3) free, examine the lower part of the OPERATING ROD 14. Make sure the NOZZLE has been centered correctly. THE NOZZLE should now be held firmly against the NOZZLE SEAT 43 (Fig. 21) by the PUMP-BODY-LIFTING SPRING at the side of the MELTING POT and there should be no interference with the PUMP-BODY-LIFTING LEVER 15 (Fig. 3) to prevent its seating the NOZZLE properly. Take the ROD 14 in the fingers and raise it so that the WASHER 5 comes against the LEVER 15 and see that there is $\frac{1}{16}$ " clearance between the WASHER 9 and the SWING-FRAME CASTING 10. If it is necessary, adjust the position of either WASHER 5 or 9 to obtain this clearance. Then test again the adjustment of the NUT 2 at the top of the ROD 14.

PISTON SPRING

One Adjustment—Position of NUT at upper end of PISTON SPRING ROD 1 (Fig. 5).

Object: To give proper PISTON pressure.

PROCEDURE

Be sure the NUT is on right side up. The knurled side should be on top. Screw down or up the NUT on the upper end of the PISTON-SPRING ROD 1 (Fig. 5) to give

just sufficient pressure to get solid product. Do not use more pressure than is necessary. The smaller bodies require less pressure.

CLEANING THE PUMP BODY

The PUMP BODY on the large POT has an intake valve and the PLUG which screws in the bottom of this PUMP BODY is counterbored $\frac{1}{8}$ " larger than is the PLUG on our standard composition PUMP BODIES. Care should be taken therefore never to attempt to use a PLUG from a Composition or Type-&-Rule PUMP BODY on this larger PUMP BODY or it will cause damage to the PISTON and PUMP.

The PUMP ARM is drilled with a $\frac{5}{16}$ " PUMP ARM DRILL (instead of $\frac{1}{4}$ " as used on other PUMP BODIES). The PLUG 3 (Fig. 10) in the NOZZLE end of the ARM is removed, as well as the large PLUG 8 on the bottom of the PUMP, and the drilling is done from the NOZZLE end and not from the PISTON end.

Before attempting to clean a PUMP BODY be sure you have in your plant a duplicate of the PLUGS and VALVE SEAT to be removed and of the INTAKE VALVE. These are 3, 7, 8, 11, 12 and 13 (Fig. 10).

The PUMP BODY must be hot when taking out the PLUG and VALVE SEAT. With the PISTON and NOZZLE removed, let the PUMP BODY stand in the molten metal in the MELTING POT until thoroughly hot. Carefully empty all molten metal out of the PUMP BODY and take the PUMP BODY to a vise where the PLUGS and VALVE SEAT should be loosened while still hot.

Grip the bottom PLUG 8 (Fig. 10) in the vise with the PUMP BODY standing erect as in casting position. Tap the arm of the PUMP BODY in a counterclockwise direction to loosen the bottom PLUG 8, but do not unscrew it. Loosen NUT 9 and take out the REGULATING SCREW 10. Loosen PLUGS 3, 7 and 13 and VALVE

SEAT 11. The object of loosening all the PLUGS and VALVE SEAT without stopping to remove them is to be sure that this work is done while the parts are still hot, because if they become cold they would stick so that it would be necessary to return the PUMP BODY to the MELTING POT to reheat it. All the PLUGS and the VALVE SEAT may now be removed and the VALVE 12 also.

By this time the PUMP BODY will be cooled sufficiently so that it may be drilled without damage to the PUMP-ARM DRILL. The PUMP ARM is to be drilled from the NOZZLE end where PLUG 3 (Fig. 10) is taken out. A $\frac{5}{16}$ " PUMP ARM DRILL is used. Be very careful not to run the drill down far enough to injure the threads in the bottom of this PUMP where PLUG 8 screws in. The connecting hole from this diagonal hole to the NOZZLE is large and seldom clogs, but should be tested with the $\frac{5}{16}$ " drill to be sure it is clear.

Also run a $\frac{3}{16}$ " drill through the hole from which PLUG 7 (Fig. 10) was removed. This clears the passage from the VALVE CHAMBER into the PUMP BODY.

When assembling the PUMP BODY all parts must be hot. These can be heated in the type metal, but the MELTING POT should be cleaned and skimmed before doing so. All PLUGS should have a little graphite applied to the threads before they are screwed into the PUMP BODY. To insert PLUG 8, hold the PUMP BODY in the vise and screw the PLUG in with the pipe pliers. This PLUG should be screwed in only as tightly as can readily be done with the pipe pliers, but be sure that it is up to good solid bearing and not held out of position by dirt or dross in the threads. If there is dirt or dross in the threads of this PLUG so that it cannot be screwed in with the pipe pliers, this dirt and dross must be scraped out—an old hack-saw blade is useful for this when used by hand and not in a hack-saw frame. All other PLUGS should be brought up to an easy bearing,

using the proper wrench which fits each PLUG. Do not screw them in hard as that would make it difficult to remove them the next time.

It is well to have the PUMP BODY in a horizontal position when inserting VALVE SEAT 11 (Fig. 10) and PLUG 13 with VALVE 12 between them, as it is easier to handle VALVE 12 in this position. Make sure that VALVE 12 seats properly against VALVE SEAT 11 and if it does not, grind it in with a little valve grinding compound. When inserting REGULATING SCREW 10, leave $\frac{1}{8}$ " clearance between the bottom of that SCREW and the head of the VALVE 12. The adjustment of this SCREW is made after the PUMP BODY is in the MACHINE and the metal hot.

The NOZZLE and PISTON are put in after the PUMP BODY is in position in the MELTING POT and both should be heated by immersion in the molten metal before replacing them in the PUMP BODY. The drilling of the NOZZLE is fully covered under the section entitled "NOZZLES," page 7 and following.

CASTING

LENGTH OF STROKE

The length of stroke of the MOLD BLADE is governed by the hole in the BELL CRANK 4 (Fig. 19) in which the STUD 3 is placed and by the position of the two MICROMETER WEDGES 9 and 10 (Fig. 17).

There are three different conditions governing the use of this BELL CRANK and these MICROMETER WEDGES:

First: When the product is continuous strip leads or slugs cast with a BLANK MATRIX without any drive in it, which is never raised off the MOLD. The length of stroke should be determined and the ADJUSTING STUD

3 (Fig. 19) placed in the proper hole in the BELL CRANK 4. Turn MACHINE until there is no compression on the SPRING BOX.

Screw down the left MICROMETER WEDGE 10 (Fig. 17) with the right KNURLED HEAD 15 as far as it will go and back it off one turn and lock it with its LOCK NUT 14. This is approximately the proper position of this WEDGE for all lengths of stroke for fusion material. Check it by seeing that the right end of the MOLD BLADE stops about $\frac{1}{8}$ " to the right of the CLOSURE.

Turn the MACHINE until the MOLD BLADE is at the right end of its stroke. Note the position on the SCALE on the STAND 3 (Fig. 22) that the 0 on the MOLD-BLADE-OPERATING ROD 2 comes when in the right hand position. From this mark, count back the number of picas of the length of stroke desired, marking this on the SCALE on the STAND 3 with a pencil. Turn the MACHINE until the MOLD BLADE is at the left end of its stroke and note whether the 0 comes to this pencil mark or goes by it. If it does not come exactly to the mark, the right MICROMETER WEDGE 9 (Fig. 17) must be raised or lowered by unlocking the LOCK NUT 3, and raising or lowering the left KNURLED HEAD 2 until the 0 (Fig. 22) comes to the pencil mark when compression is on the SPRING BOX. Tighten the LOCK NUT 3 (Fig. 17) and note that the compression on the SPRING BOX is about equal at each end of its stroke. If it is unequal, loosen the NUT 6 (Fig. 19) and screw the ROD in or out of the SOCKET 5 until the compression is equalized.

Second: When the product is continuous strip rules using a MATRIX with a face driven in it so that the MOLD BLADE at its left end must match the end of the drive of the MATRIX, the right MICROMETER WEDGE 9 (Fig. 17) (left hand KNURLED HEAD 2) is used to determine exactly the left hand position of the MOLD BLADE to exactly line with the face of the rule or design in the MATRIX in addition to placing STUD 3 (Fig. 19) the

desired hole in BELL CRANK 4 to give proper length of stroke. The left MICROMETER WEDGE 10 (Fig. 17) (right hand KNURLED HEAD) is not to be changed from its setting for fusion material as given above under "First."

Third: When the product is cast from a MATRIX which must be raised at each stroke, such as logotypes, corner pieces, and other non-fused product which must be exact length, both MICROMETER WEDGES 9 and 10 (Fig. 17) must be used to determine exactly the location of each end of the stroke in addition to positioning STUD 3 (Fig. 19) in proper hole of BELL CRANK 4.

The above settings are approximate and must be tested by casting product. Therefore, proceed as follows:

Swing the MOLD OILER into position and turn on the oil. Put a few drops in the left end of the opening between the MATRIX GUIDES 7 and 27 (Fig. 23) to reach the right end of the MOLD BLADE, oil the MOLD CLOSURE 25 where it passes under the SHOE 24 and where it enters under the front BOLSTER 34, and drop a few drops into the same opening that the MOLD OILER feeds to be sure the MOLD is oiled while the MOLD OILER is getting into action.

Caution: Use only "Rule Mold Oil" for oiling this MOLD. The use of any oil other than "Rule Mold Oil" will cause trouble with casting and with the MOLDS themselves.

The MOLD-CLOSURE-STOP-PLATE ABUTMENT 6 (Fig. 24) must be adjusted to suit the point size of product being cast. For 2-point and 12-point the thick side of this ABUTMENT is turned toward the front (that is, toward the STOP PLATE 8); while for 6-point the thinner side is turned to the front.

Run sufficient material to warm up the MOLD. Do not have the metal any hotter than necessary to get good fusion after the MOLD is warmed up. It may be necessary to start with a little hotter temperature, but

this should be reduced as low as will permit good fusion after the MOLD is warmed up. If the product has imperfections in body and face, make sure first that the PUMP BODY and NOZZLE have been properly drilled and are clean and that the PISTON SPRING is properly set for the point size being cast. Usually moving the CLOSURE toward the rear will overcome imperfections in the rear of the product, and moving the STOP PLATE toward the front usually overcomes imperfections in the front. Note on the "Ready Reference Card" the final settings of the GRADUATED WEDGE and NUT under which best conditions are obtained.

SMALL POINT SIZES

For product 3-point or smaller there are two different style MOLDS, one for fused material and one for non-fused material. The MOLD BLADE for non-fused material is straight on the casting end. The MOLD BLADE for fused material has the casting end curved. The regular setting of the MOLD BLADE stroke as described in the section under "MOLD BLADE OPERATING MECHANISM" will bring the straight end BLADE for non-fusion and the fusion BLADE which is curved both top and bottom on the casting end into the correct operating position without change.

If the top casting corner of the curved end BLADE of these small point-size MOLDS is set to the MOLD-BLADE GAGE 1 (Fig. 29) at each end of the stroke it will give a 6-pica stroke with the ends of the stroke matching the design in standard border MATRICES. This setting is usually necessary when casting from decorative design MATRICES on these MOLDS.

When using these curved end BLADES to cast from rule MATRICES and from some decorative border MATRICES where the design permits, the right end of the

stroke may be shortened about 6 points to give better fusion. This is done by readjusting the MICROMETER WEDGES to suit.

When running leads from curved end BLADES use the same MICROMETER WEDGE setting as for straight end BLADES. This keeps the 6-pica stroke but moves the whole stroke to the left, bringing the fusion point closer to the CLOSURE for better welding of the product.

In all cases be sure there is proper compression on the MOLD-BLADE SPRING BOX after the stroke has been set.

CASTING OTHER POINT SIZES

The setting of the CLOSURE, STOP PLATE and ABUTMENT for 2 point has already been described under "Mold Closure Mechanism" (page 21).

The procedure for setting the CLOSURE 16 (Fig. 21) and the STOP PLATE 48 is the same for all point sizes, only varying in the method of placing the 2-point opening between the CLOSURE and STOP PLATE.

In making all CLOSURE adjustments, always be sure that the MOLD CLOSURE CAM LEVER 24 (Fig. 21) is to the front as far as it will go and that the NUT 20 has been screwed in to bring the end of the CLOSURE back of the opening in the MOLD. Be sure that the STOP PLATE ABUTMENT 42 has the thin side toward the front for 6 point.

Six Point: Put the 6-point MOLD in position on the MACHINE as instructed for 2-point and tighten the rear SCREWS 28 (Fig. 23) while the MOLD and BOLSTER are held forward against the GAGE PLATES. Take two pieces of 2-point material, pointed at the end and place them in the MOLD opening with the lower end between the CLOSURE and STOP PLATE. Adjust the NUT 20 (Fig. 21) until it allows the CLOSURE 16 to come forward to just touch these two pieces of material and lock it with its LOCK NUT 21.

Now remove the MOLD and place one piece of 2-point material between the CLOSURE 16 (Fig. 21) and STOP PLATE 48, and tap the WEDGE 41 to bring the STOP PLATE 48 forward to touch this material. This completes the setting and the opening will be 2-points wide and near the center of the body point-ways.

All the other steps of getting the MOLD in position on the MACHINE are the same as for 2-point.

For all 6-point material, we recommend the offset NOZZLE No. 43 (Fig. 27) be tried first, as it usually gives universally good results under average conditions. Be sure to have the offset to the rear. The use of other NOZZLES is explained under "NOZZLES" (pages 7 and 8).

Twelve Point: In setting the CLOSURE for 12-point material the same steps are followed except that material of 7 points in thickness is put down inside the MOLD and between the CLOSURE 16 (Fig. 21) and STOP PLATE 48. The NUT 20 is then adjusted to bring the CLOSURE against the material and is locked with the NUT 21.

Be sure that the STOP PLATE ABUTMENT 42 (Fig. 21) has the thicker side toward the front. Put a piece of 2-point material between the CLOSURE and STOP PLATE and tap the WEDGE 41 to bring the CLOSURE forward to just touch this material. This locates the 2-point opening between the CLOSURE and STOP PLATE in the center of the 12-point MOLD opening. The No. 43 NOZZLE is suggested for 12-point material with the offset to the front.

The use of other NOZZLES is explained under "NOZZLES" (pages 7 and 8).

Where the best results are obtained in the setting of the MOLD BLADE, CLOSURE and STOP PLATE for each point size, the notation should be made on the "Ready Reference Card" so the settings can always be duplicated whenever this mold is used.

DECORATIVE BORDERS

It is assumed that the adjustments—under the head of "Matrix Operating Mechanism," (page 30) insuring that the MATRIX is lifting high enough to clear the material, and the setting of the stroke is made in accordance with instructions under "Length of Stroke" (page 38)—have been made.

Decorative border MATRICES of all point sizes have the designs complete in 6 picas, with the exception of certain hard-to-cast borders such as lithotone which use 4-pica stroke and a few special designs which cannot be made to conform to 6 picas.

Place the MATRIX 46 (Fig. 21) in its MATRIX CARRIER 47 and be sure that the TOGGLE LINK MECHANISM is properly adjusted and that the GUARD 49 (Fig. 21) is in place.

Take a piece of material matching the border to be cast, if available, cut it at the fusion point and insert it into the MOLD from the right, until it is moved to the right by the MOLD BLADE when the MACHINE is turned over to bring the BLADE to the right hand position. Tighten the CLAMPING SCREW 35 (Fig. 23) to insure that the material will not be driven from the MOLD by the force of the PUMP stroke.

If no border material of the same pattern is available, use a piece of lead or slug of the height the MOLD makes. Remove the MATRIX and fill the right (delivery) end of the drive in the MATRIX with a heavy soap or electrotypers' wax and smooth the wax or soap off even with the surface of the MATRIX. This will prevent the escape of metal on the first cast.

Turn the MACHINE over by hand to be sure everything is correct. Start the MACHINE under power and throw in the PUMP HANDLE 24 (Fig. 19) just long enough to get one cast and repeat these single casts

until four or five have been made. This method is used for safety in case there should be a squirt, since the matching of the border design has not yet been done.

Loosen the CLAMPING SCREW 35 (Fig. 23), pull the material out from the MOLD and see if the end of the design comes exactly to the end of the body on the last cast. If it hangs over, screw up on the left MICROMETER ADJUSTING SCREW 4 (Fig. 17) to raise the right MICROMETER WEDGE, but if the design comes short of the end of the body, screw down on this ADJUSTING SCREW. Always lock the ADJUSTING SCREW by means of the LOCK NUT 3. Replace the piece of material in the MOLD, tighten the CLAMPING SCREW 35 (Fig. 23), and repeat the test until design and body exactly match on the end. This adjustment is not to be changed while running this design.

The next thing is to match the design at the right end of the stroke. Throw in the PUMP and cast about half a full length strip and cut it by tripping the CUTTER by hand. An experienced operator can usually check the matching of the design by a careful examination of the product under an eye glass. It is safer, especially for beginners, to check by means of a pair of small sharp-pointed dividers. Set these to exactly match about half the units of the design, entirely within one cast. Then turn the dividers to straddle a weld and see if it matches the same number of units and at the same place on the units as it did within the cast. This measurement must be very carefully examined under an eye glass to be sure the span matches exactly at the same place in the design in both cases. If the match is not exact, the left MICROMETER WEDGE 10 (Fig. 17) is to be moved by means of the right hand SCREW 13 and HEAD 15—if the design straddling a weld comes short of the divider setting, raise the SCREW but if it comes longer than the dividers, lower the SCREW. Only a very slight amount of adjust-

ment should be necessary. This method of matching the design can be applied to all point sizes and to practically all designs.

NON-FUSION

Single Column: Most newspapers have one or two different single-column widths. When putting on the MOLD for casting column-width material, instead of pushing a long piece of product in from the right to close the exit of the MOLD after the MOLD has been entirely assembled in its HOLDER, it is sometimes more satisfactory to use two or three pieces of the non-fusion product to be cast. Be sure the TOGGLE LINK MECHANISM is set to lift the MATRIX high enough to clear the product to be cast from the MATRIX being used. Also be sure the MOLD is the correct height to suit the depth of drive of the MATRIX being used—for .065" drive cut-off dashes the .853" high column-rule MOLD must be used; for column-width decorative end cut-off dashes a MOLD .888" high is required; while for the special .015" drive 2-point classified ad rule MATRIX, a MOLD .903" high is needed.

SETTING THE STROKE FOR NON-FUSION

Figure 22 shows the SCALE on the MICROMETER WEDGE STAND 3 which is graduated in Picas from 0 to 15.

The maximum length of stroke for non-fusion cast is 15 picas, which is obtained by having the STUD 3 (Fig. 19) in the hole 7 (Fig. 18) and the MICROMETER WEDGES 9 and 10 (Fig. 17) raised as far as possible.

If a cast of 15 picas is desired, turn the MACHINE until the MOLD BLADE is at the right end of its stroke and note that the 0 on the MOLD BLADE OPERATING ROD 2 (Fig. 22) comes to the 15 mark on the SCALE on STAND 3. Adjustment of the left WEDGE 10 (Fig. 17) is

made by moving the right KNURLED HEAD 15 and should be so made that the mark 0 on the MOLD-BLADE OPERATING ROD 2 (Fig. 22) stops at the 15 mark on the SCALE on the STAND 3.

Then turn the MACHINE until the MOLD BLADE is at the left end of its stroke and adjust the right WEDGE 9 (Fig. 17) with the left KNURLED HEAD 2 until the 0 on the OPERATING ROD 2 (Fig. 22) comes to the 0 on the SCALE on the STAND 3.

The above setting positions the stroke so that the CLOSURE opening will come about in the middle of the 15-pica cast.

If a narrower column width of say 13 picas is wanted, then both MICROMETER WEDGES should be moved to shorten the stroke equally at each end—in this case, one pica at each end. The 0 on the OPERATING ROD 2 (Fig. 22) would then stop at 14 on the right and at 1 on the left. This method keeps the CLOSURE at the center of the non-fusion cast. It is, of course, understood that the CLOSURE adjustment is made in accordance with the standard instructions for setting the CLOSURES.

AUTOMATIC STACKER-CUTTER FOR NON-FUSED PRODUCT (COLUMN-WIDTH MATERIAL)

STACKER CUTTER

Four Adjustments

First: For position of fixed SHEAR BLADE 16 (Fig. 16) with relation to its BRACKET 12.

Second: Position of opening in BRACKET 12 relative to line of travel of product.

Third: Position of GUIDE 15.

Fourth: Position of CUTTER to suit length of cast.

PRELIMINARY

Before starting these adjustments all parts of the CUTTER and STACKER for non-fused material should be out of the way so that the product has a clear path the same as for long lengths of fused material.

Adjust the MOLD BLADE to produce the exact length of non-fused product desired with face properly positioned on the cast, column-width way. Make several casts to be certain the product is uniform and moved out from the MOLD the correct distance. On these trials make but one cast at a time and remove each cast with the fingers to be sure it does not tilt and jam against the parts of the CUTTER for long fused material. Stop the MACHINE with the MOLD BLADE in its extreme right position and the end of the last cast projecting from the MOLD normally. This insures that the product cannot be pushed back into the MOLD during the adjustment, because it is backed up by the BLADE. See that the end of the material has no burrs from partial weld to the previous cast and that the end of the mate-

rial is smoothly clean. Then put the STACKER on the MACHINE, move it to the left until SHEAR 14 is close to the end of the product, and clamp the STACKER with BOLT 13 (Fig. 16).

First

Object: To insure a free line of travel for the product.

PROCEDURE

Loosen SCREW 18 (Fig. 16) and adjust the fixed SHEAR BLADE 16 by means of ADJUSTING SCREW 17 until the front of the SHEAR opening in it comes flush with the front of corresponding opening in the BRACKET 12. Lock the BLADE 16 with SCREW 18, while holding the BLADE 16 forward against the SCREW 17 and make sure the adjustment holds.

Second

Object: To prevent bending product when SHEAR acts.

PROCEDURE

Loosen BOLTS 6 (Fig. 16) and turn SCREW 19 to move the BRACKET 12 forward or back until the front side of the SHEAR opening in it just touches the front side of the product as it comes from the MOLD. Tighten the BOLTS 6 while holding BRACKET 12 forward so that front BOLT 6 bears against SCREW 19 and see that the adjustment holds. This adjustment must be made for each change of point size.

Third

Object: To support the product on the rear side and guide it into the SHEAR opening.

PROCEDURE

Loosen SCREW 11 (Fig. 16) and slide the GUIDE 15 forward until it just touches the rear of the product as it comes from the MOLD. Tighten SCREW 11 and see

that the adjustment holds. The GUIDE must support the product but must not bind or mark it. This adjustment must be made for each change of point size.

Fourth

Object: To position the CUTTER BLADE so that its cutting edge comes exactly at the point of non-fusion of the product.

PROCEDURE

Loosen the BOLT 13 (Fig. 16). Raise the SPRING CLIP 2 and move the ROCK SHAFT 1 to the left to disconnect the ARM 25 from the PIN 26 which operates it. Move the movable SHEAR-BLADE CARRIER 5 forward until the SHEAR BLADE 14 covers the opening through which the product is to pass, then move the entire SHEAR MECHANISM to the left until the side of the SHEAR BLADE 14 comes against the end of the product projecting from the MOLD. Tighten BOLT 13 and test with the SHEAR in action (ROCK SHAFT 1 pushed to the right with ARM 25 engaging PIN 26). See that the adjustment holds. If the SHEAR cuts a shaving from either end of the product, readjust in the required direction to correct this.

Caution: When moving the CUTTER and holding it to tighten the BOLT 13 (Fig. 16), be careful not to tilt or to press down on the BRACKET 12, because the CUTTER has only a narrow base about the BOLT 13 and if tilted so that it is clamped unevenly when the BOLT 13 is tightened it will cut the end of the strip diagonally instead of square across.

For the shorter non-fused casts it may not be possible to move the SHEAR MECHANISM close enough to the MOLD to take the first length of cast outside the MOLD. In this case, move the SHEAR MECHANISM to the right to take the second piece out from the MOLD. The first

piece will be held in position by the GUIDE 15 (Fig. 16) for delivery. No non-fusion material can be cast and stacked shorter than 9 picas in length.

STACKER BAR

One Adjustment—Position, both sideways and front and back.

Object: To receive and support the product as it comes from the MOLD and is pushed into the column.

PROCEDURE

Put in position the STACKER BAR MECHANISM and insert its BOLT 43 (Fig. 16). Adjust the STACKER BAR 22, front and rear, so that the lug at the rear end of it will just clear the rear side of the product as it comes from the MOLD and at the same time adjust the BAR, right and left, so that the product as it comes from the MOLD will compress the SPRING 21 just enough to keep the product standing erect and prevent it falling back into the path of the next piece after it has been pushed forward by the SHEAR BLADE 14. Tighten the BOLT 43 and test the setting by casting a few pieces and observing how they are received and stacked. In making this test it is well to operate the PUMP so that one cast is made every few revolutions.

This adjustment must be made to suit each change of product, both point size and length.

AUTOMATIC CUTTER AND STACKER FOR CONTINUOUS STRIPS

TRANSFER BARS

Two Adjustments

First: Position when all the way forward to deliver product.

Second: Position when all the way back to receive product.

PRELIMINARY

Trip the CUTTER and turn the MACHINE, with a 2-point lead in the CUTTER, until the SHEAR BLADE comes against this lead just ready to cut it. At this point the front face of the rear TRANSFER BAR should be from 4 to 6 points back of the front end of the SHEAR-GAGE LUG. This test is for checking purposes only, as there is no adjustment for it, because the fitting of the parts takes care of this point.

First

Object: That the TRANSFER BARS 7 and 8 (Fig. 13) shall carry the product forward far enough to clear the front end of the SHEAR-GAGE LUG 21 (Fig. 14) and open far enough to release 12-point material at the proper position.

PROCEDURE

Turn the MACHINE, with the CUTTER tripped, until the TRANSFER BARS 7 and 8 (Fig. 13) are all the way forward. Hold the TRANSFER BARS toward the rear by pressing with the fingers against their left HANGERS 10 and 11 (Fig. 12) and adjust the SCREW 34 (Fig. 13)

in the lower end of LEVER 6 and lock it with LOCK NUT 33 to get from 14 to 16 points between the TRANSFER BARS 7 and 8. The HANGERS should in this position just touch the steps of the STACKER GUARD 4 (Fig. 12) with preferably not over $\frac{1}{16}$ " clearance between the front HANGER 11 and the front step of the GUARD 4. The TRANSFER BARS 7 and 8 (Fig. 13) must not press against the GUARD 4 (Fig. 12) so as to spring it forward as this would wear the LEVER 6 (Fig. 13). Test this adjustment to see that it holds.

With the MACHINE turned to the same position (that is, with the TRANSFER BARS 7 and 8 all the way forward), the front face of the rear TRANSFER BAR 7 should be from $\frac{1}{16}$ " to $\frac{1}{32}$ " in front of the front end of the SHEAR-GAGE LUG 21 (Fig. 14) (the LUG on the left end of the SHEAR-GAGE) when the SHEAR-GAGE is positioned opposite the left BRACKET. If it is less than $\frac{1}{16}$ ", bend the GUARDS 4 (Fig. 12) and 13 (Fig. 15) — 1 and 14 (Fig. 11) — toward the front enough to let the TRANSFER BAR come as described and readjust the ADJUSTING SCREW 34 (Fig. 13) in the LEVER 6.

Second

Object: To bring the TRANSFER BARS 7 and 8 (Fig. 13) in line with the opening in the SHEAR-BLADE GUIDE 6 (Fig. 12) so that the product will enter the TRANSFER BARS properly.

PROCEDURE

Turn the MACHINE so that the SHEAR BLADE is all the way to the rear and adjust the ADJUSTING SCREW 14 (Fig. 13) to bring the TRANSFER BARS 7 and 8 in line with the opening in the SHEAR-BLADE GUIDE 6 (Fig. 12). Test this by placing a piece of 6-point strip material between the TRANSFER BARS 7 and 8 (Fig. 13) and extending into the opening in the SHEAR-BLADE GUIDE 6 (Fig. 12).

SHEAR-BLADE-SHOE-TUBE FRICTION PLATE

One Adjustment—Tension.

Object: To insure accurate length of cut material by preventing overthrow or rebound of floating SHEAR-BLADE-SHOE TUBE 27 (Fig. 14).

PRELIMINARY

See that the SPRING 13 (Fig. 14) has not been stretched to make it weak nor shortened to make it stronger. If it has been altered in any way, replace it by a new one.

PROCEDURE

Adjust the FRICTION PLATE 16 (Fig. 14) to make it as stiff as possible and just let the SPRING 13 return the GUIDE 6 (Fig. 12) to the left with the MACHINE running. The vibration of the running MACHINE helps this return. To adjust the FRICTION PLATE 16 (Fig. 14) take it off and bend its two fingers so that when put on again they will bear a little too hard against the TUBE 27. Put a little oil on the TUBE where the FRICTION PLATE 16 bears and, with the MACHINE running, bend the fingers back a little at a time until they will just let the GUIDE 6 (Fig. 12) return to the left after a stroke to the right.

GUIDE PLATE

One Adjustment—Position.

Object: To support 2 point and smaller material.

PRELIMINARY

Put on the GUIDE PLATE 4 (Fig. 11) with its COLLAR 5, using the same BOLT 13 (Fig. 16) to hold it as is used for the non-fusion STACKER.

PROCEDURE

Have the GUIDE PLATE as far to the right as possible without interfering with the CUTTER. While casting material, align the GUIDE PLATE by swinging its right end slightly front or back to be sure that the material does not rub on either side of the GUIDE PLATE. Then tighten NUT 9 (Fig. 16).

This adjustment of the ROLLER 12 (Fig. 11) gives a 3-point bearing for the material and if it is straight at the start and down solid as described, it will continue to come straight and stay down.

LENGTH OF LEAD OR RULE

One Adjustment—Position of complete SHEAR GAGE.

Object: To obtain any length of lead or rule to 25".

PROCEDURE

Loosen the CLAMP SCREW 26 (Fig. 14) and slide the complete SHEAR GAGE to the right or left on the TUBE 27 until the LUGS 20 or 21 against which the lead or rule strikes, is the required distance (as measured by a gage) from the cutting edge of the SHEAR BLADE 13 (Fig. 12). Tighten the CLAMP SCREW 26 (Fig. 14). Cast and cut a few lengths and adjust for exact length by the MICROMETER ADJUSTING NUT 15.

Always use the LUG 21 (Fig. 14) on the SHEAR GAGE which is nearest the CUTTER BLADE (to the left) except when the lead or rule is too long (see following caution), then it is necessary to use the fixed LUG 20 to the right.

Caution: No material to be cut and stacked should be more than 25 inches long. When casting these long leads or rules be sure that when the lead or rule has pushed the SHEAR GAGE 20 (Fig. 14) as far to the right

as possible there is at least $\frac{1}{8}$ " clearance between the SHEAR GAGE and the right hand GUIDE 8 (Fig. 15).

Caution: Never cut leads or rules any length less than the stroke of the MOLD BLADE. Do not lengthen the stroke of the MOLD BLADE on fused material beyond the ability of the CUTTER to handle — the stroke of the MOLD BLADE, added to the movement necessary to trip the CUTTER, must be within the total movement of the SHEAR-BLADE GUIDE 6 (Fig. 12).

STACKER-BAR-ADJUSTING-STAND ADJUSTING SCREWS

One Adjustment—Height of corner of GALLEY PLATE 38 (Fig. 16).

Object: To make continuous strip material straight.

PRELIMINARY

Cast two long lengths of material and place them foot to foot. If they touch in the middle and not at their ends the rear right corner of the GALLEY PLATE 38 (Fig. 16) over which the product passed is too high. If they touch at the ends and not in the middle it is too low.

PROCEDURE

Adjust the rear right corner of GALLEY PLATE 38 (Fig. 16) up or down by means of SCREWS 39 and 40 until two pieces of product when placed foot to foot will touch along their entire length.

This test should be made each time a MOLD is changed and on long continuous casts the test should be made from time to time as a check.

SCREW 40 (Fig. 16) bears against the upper side of GALLEY PLATE 38, while SCREW 39 passes through the GALLEY PLATE and has a head beneath it. To raise the corner of the GALLEY PLATE 38 back off SCREW 40 the desired amount and then back out SCREW 39 until it brings the PLATE 38 up tight against SCREW 40. To lower the PLATE, screw down SCREW 39 the desired

amount and then screw down SCREW 40 until it is tight against the PLATE 38.

GUIDE ROLLER

One Adjustment—Alignment and height.

Object: To prevent material raising.

PRELIMINARY

The STACKER-BAR-ADJUSTING-STAND ADJUSTING SCREWS (see preceding adjustment, page 56) must be in adjustment before adjusting this GUIDE ROLLER. The GUIDE ROLLER BRACKET 10 (Fig. 11) may be used either alone or on top of the GUIDE PLATE 4 in place of its COLLAR 5. Use the same BOLT 13 (Fig. 16) that is used for the non-fusion STACKER and for the GUIDE PLATE.

When running column rule a steel ROLLER a178F7 is substituted for the rubber-faced ROLLER 12 (Fig. 11). This steel ROLLER is grooved so that it does not touch the face of the rule but bears only on the level.

PROCEDURE

Line up the ROLLER 12 (Fig. 11) correctly with the travel of the product. Adjust the height of the ROLLER by turning its HANDLE 9 to bring the ROLLER down against the top of the product when the product is resting solidly on the MOLD-HOLDER BASE and on the rear right (adjustable) corner of the GALLEY PLATE 38 (Fig. 16) after that corner has been adjusted to make material straight as described under "Stacker-bar-adjusting-stand Adjusting Screws" (page 56).

SHORT LENGTHS

One Adjustment—Substitution of special parts.

Object: To insure cutting and stacking of short lengths (15 picas or less) accurately on the AUTOMATIC CUTTER.

Parts required are the special broad PAWL FINGER 7 (Fig. 11) and the special SHEAR STOP 8 for CUTTER HEAD. The standard SCREW 48 (Fig. 16) and SPRING 47 are used with these special parts.

PROCEDURE

The broad FINGER 7 (Fig. 11) is applied in place of the regular narrow FINGER 27 (Fig. 16) in exactly the same position, using the same SCREW 48 and SPRING 47 on it. STOP 8 (Fig. 11) is held in position by BOLT 43 (Fig. 16) and the rear end of this STOP 8 (Fig. 11) is placed to the left of the SHEAR BLADE GUIDE 6 (Fig. 12); that is, between the SHEAR-BLADE GUIDE and its ABUTMENT, pulling the SHEAR-BLADE GUIDE to the right to get the STOP 8 (Fig. 11) into this position.

The broad FINGER and STOP keep the SHEAR-BLADE GUIDE 6 (Fig. 12) farther to the right at all times so that the short lengths will enter farther into the TRANSFER BARS 7 and 8 (Fig. 13) before being cut and the TRANSFER BARS can grip them and carry them into proper position on the galley for stacking.

Caution: When the broad FINGER 7 (Fig. 11) and the STOP 8 are used, the stroke of the MOLD BLADE must never exceed one inch. If a longer stroke is used with these parts, the CUTTER will jam and something will break. Be very careful when changing from short lengths to long lengths and increasing the stroke beyond one inch, to remove both the broad FINGER 7 and the STOP 8 and replace the regular narrow FINGER 17 (Fig. 13).

MATERIAL MAKING MACHINE MOLDS

DIRECTIONS FOR TAKING APART

CLEANING AND REASSEMBLING

Do not take MOLDS apart unless necessary. Under proper conditions they will run for a long time but in some plants certain conditions of type metal, temperature, etc., seem to cause a deposit to collect on the casting faces of the MOLDS. This deposit is a brownish film which burns on to the faces of the TYPE BLOCKS and gradually builds up so that it eventually interferes with the free ejection of the material. This may cause the MOLD BLADE to hang up so that the MOLD cannot be operated satisfactorily.

TAKING APART

In such cases it is necessary to take the MOLD apart in order to get at and remove this burned-on deposit. Never try to clean a MOLD without taking it apart, for to do so will soon ruin the MOLD. For the same reason, no cleaning or polishing compound should ever be fed into a MOLD while operating.

To take the MOLD apart, remove its four SCREWS, using a good screw-driver with a square point fitted to the slot in these SCREWS. Our medium size casting machine screw-driver is best suited for this purpose. Be sure the point is dressed square so as not to damage the slot in the SCREWS.

CLEANING

It is impossible to place too much importance on the necessity for the greatest care in cleaning these MOLDS. The parts look simple but they are precision ground

with the greatest accuracy. Any careless or excess rubbing when cleaning will damage the parts and make repair or replacement necessary.

The greatest care must be used not to round the edges of the BLOCKS or damage the nick if the MOLD has one. The same care in cleaning the BLADE must be used not to round the edges of the BLADE or the nick slot. Remove only the built-up carbon deposit and do not rub the steel of the parts themselves. Do not mistake discoloration for deposit—discoloration does no harm but any rough built-up carbon deposit must be removed.

For cleaning a MOLD some skillful operators find they get best results with least chance for damaging or rounding the edges of the parts if they use a hard white Arkansas stone about $\frac{5}{8}$ " x $\frac{5}{8}$ " x 4" in size. If purchased locally be sure it is the "hard" grade of white Arkansas stone as any other kind or grade will be too free cutting and will ruin the finish on the parts of the MOLD.

To use such a stone, wet both TYPE BLOCK and stone with benzine or its equivalent, lay the stone flat on the BLOCK, hold it firmly but do not press too hard, give one slow careful stroke in the direction of travel of the product and then examine the BLOCK. Use an eye glass for this examination, as the eye alone cannot tell the story. If carbon still remains give a second stroke of the stone and another examination and repeat until the BLOCK is smooth and free from carbon. As previously stated, remove only the carbon and do not try to remove the discoloration, because to do so would cut into the face of the steel, damaging the BLOCK. Be especially careful on a BLOCK having a nick not to rub the nick as it is easily damaged.

Some operators prefer a polish for cleaning a MOLD. There are two objections to the use of polish. First: All polishes depend on grit for their means of cleaning and

polishing. This grit will wear into the polished surface of the MOLD in proportion to the speed with which the grit cleans. Second: It is difficult when using polish to keep the surface and edges flat and square.

The MONOTYPE COMPANY supplies a "Mold Cleaning Compound" which is a polish of very smooth consistency and when used in accordance with full directions on the can will clean the MOLD with practically no wear on the parts. These directions call for using the side of a 36-point quad for applying the compound and being careful not to run over the edges. Do not rub more than necessary, and remove only the built up carbon deposit. Never try to take off the discoloration as that is in the steel itself—remove only the carbon deposit.

Be sure after the parts have been cleaned they are wiped perfectly free from all cleaning compound or particles of grit or dust before starting to assemble the MOLD. To be sure all cleaning compound is removed, wet the parts with benzine or its equivalent and polish them dry with a clean cloth free from lint.

ASSEMBLING

Assembling the MOLD requires the greatest care and patience to get the parts exactly right. The MOLD is one piece of mechanism where "near enough" will not answer; the assembly must be "exactly right."

The TYPE BLOCKS and POINT BLOCKS, having previously been thoroughly cleaned as described above, are assembled and the four SCREWS holding them are tightened moderately hard. Have the parts as nearly flush on top as can be made with ordinary care and the holes for the through BOLTS in the POINT BLOCKS in line with those in the TYPE BLOCKS; this will also line up the TYPE BLOCKS correctly endways and give the proper clearance for the MATRIX GUIDES.

Take this assembled MOLD to a smoothly surfaced plate. If none better is available, the top surface of the MAIN STAND on the MACHINE itself immediately in front of the MICROMETER-WEDGE STAND may be used. Turn the MOLD upside down on this surface plate and with the corner of a pig of type metal (never use anything harder) lightly tap each end of each TYPE BLOCK until the MOLD rests evenly without any rock on the surface plate.

Test the TYPE BLOCKS, using the edge of a 6- or 12-point MOLD BLADE (a two-point MOLD BLADE is too springy to be reliable). Place the edge of the MOLD BLADE across the two TYPE BLOCKS and hold to the light to see whether they are absolutely in line. This test is to be made on the top of the MOLD at each end of the left high part of the MOLD and at the left end of the right high part of the MOLD; that is, at three places on the very top of the MOLD. If any point shows low under this test, turn the MOLD upside down again on the surface plate and tap the bottom of the TYPE BLOCK with the pig of type metal over the point that showed low on the top of the MOLD. Usually when a low point is noticed, and the MOLD is turned upside down, there will be a slight rock to the MOLD on the surface plate and the low spot should be rocked up and held in that position while it is tapped with the pig of metal. This brings it down solid so that there is no rock left in MOLD and the TYPE BLOCKS will be even on top.

During this evening-up of the TYPE BLOCKS, pay no attention to the POINT BLOCKS. As soon as the TYPE BLOCKS are in line, turn the MOLD upside down on the surface plate and insert endwise down between the TYPE BLOCKS a piece of strip material not over two inches long. By tapping on this strip material, bring the POINT BLOCKS down flush with the top surface of the MOLD. On MOLDS with a nick, material smaller than the point size of the MOLD must be used.

Test again with the edge of the MOLD BLADE across the TYPE BLOCKS in the same way that the TYPE BLOCKS were tested for parallel. It is absolutely essential that the left POINT BLOCK be perfectly flush with the top of the TYPE BLOCKS at both ends of the POINT BLOCK. The right POINT BLOCK should be nearly flush, but if it is a little below the TYPE BLOCKS, it will do no harm because there is ample clearance between the right POINT BLOCK and the top of the product. The left POINT BLOCK as it acts as a GUIDE for the MOLD BLADE, must be exact. If the left POINT BLOCK and the two TYPE BLOCKS are perfectly flush on top, as described, there will be no "catch" when feeling across the top of them with the fingernail in either direction.

When the MOLD is correctly assembled and adjusted as described, tighten all four SCREWS as hard as they can be brought up without damaging the heads and again test to see that this has not changed the adjustment. If it has, another tap or two without loosening the screws will correct it.

Oil the BLADE and the inside of the MOLD thoroughly with "Rule Mold Oil" and rub a little on the outside of the MOLD to keep it from rusting, and the MOLD is ready for use or for storing away.

Caution: There is a slight variation in the depth of counterbore for the screw heads and the SCREWS are made to suit. Be sure when reassembling a MOLD that none of the SCREWS project beyond the face of either TYPE BLOCK (either end of the SCREW). If any SCREW projects, it must be changed to another position where it does not project or else altered to suit the hole it is in. The SCREWS of small point size MOLDS are not the same length as those in large point size MOLDS. Therefore do not change SCREWS from one MOLD to another. When ordering SCREWS, specify the point size MOLD

for which wanted and even then they may have to be slightly altered either for thickness of head or length under the head to suit the individual MOLD.

OPERATING INSTRUCTIONS

Direction of Rotation: The MOTOR and the STEP PULLEY on the MACHINE run clockwise, looking at the MACHINE from the left end; that is, the top of the PULLEY moves toward the front of the MACHINE.

Speed: The MACHINE has a GEAR SHIFT which provides for four different speeds. It also has two STEP PULLEYS on MOTOR and CAM SHAFT, which double the number of speeds, making a total of eight different speeds obtainable on the MACHINE. The ratio of these speeds is given on the PLATE (see Fig. 26) located above the GEAR SHIFT HANDLE. The approximate speed in revolutions per minute is obtained by multiplying these ratio numbers by 10 for the motors furnished by us which have a speed of 1150 r.p.m. The CONE PULLEY referred to on this PLATE is the one on the CASTING MACHINE (not on the MOTOR).

The average speeds for the various products and the ratio numbers on the PLATE which will give approximately these speeds is shown in the Table on page 93.

Remember that these speeds are what may be expected after the MOLD is heated up under proper running conditions. When starting in the morning, or after the MACHINE has been standing, it should be started on slower speed until all parts are heated up and under normal running conditions. The speed may then be gradually increased until the maximum satisfactory speed is found for the particular product being cast.

The **Length of the Cast** depends principally upon the product to be cast. On borders the length of cast is fixed by the design and cannot be varied. On other material, especially leads and slugs, the length of cast may be varied somewhat to suit the character of the type metal, speed, temperature of the metal, and the amount of water being used. The average length of cast for different products of the various point sizes is shown in the Table on page 93 and a reference to the chart with Fig. 18 will show in which hole in the BELL CRANK 4 (Fig. 19) the MOLD-BLADE-BELL-CRANK STUD 3 should be placed to give this length of cast.

The **Average Temperature** for most products is about 600° to 625° for standard MONOTYPE metal. When casting 2-point product a higher temperature may be used, and in fact is sometimes required, especially on rule work. Do not, however, blame a chilled appearance, or failure to fuse, on the metal temperature being too low, because in the majority of cases this is caused by the temperature of the MOLD being too low, due either to too much water or to not having been casting long enough to properly heat up the MOLD—the MOLD should be hot to the hand. When using other than standard MONOTYPE metal the temperature will have to be varied to suit. Usually Linotype metal requires a slightly higher temperature for fusion than MONOTYPE metal as it is less free flowing.

The **Water** has a separate regulation for each of the two MOLD BOLSTERS through which it flows. The flow should be about equal through each and should come from the MOLD hot enough so that it can just be borne on the hand. Whether sufficient water is being used can usually be determined from the appearance of the metal, as a chilled appearance due to too much water is readily detected. Blistered body may be caused by

too little water, although more likely to be caused by too high metal temperature, too fast speed, or incorrect size of MOLD CLOSURE opening.

When Starting in the morning, or after stopping to change MOLDS or for any other reason, get the POT up into casting position as soon as possible, to heat the MOLD. Run no water through the MOLD until casting is started and the MOLD heated up. When casting is stopped temporarily, shut off the water at once and leave the MELTING POT raised, to keep the MOLD heated. If the MACHINE is stopped for purpose of changing the MOLD, the water should be permitted to run and the MELTING POT should be lowered, so that the MOLD will cool off sufficiently for handling.

Oiling: Before starting the MACHINE for the first time, fill the CAM CASE with MONOTYPE Type Mold Oil until the oil shows in the sight feed ELBOW. This usually requires between two and three gallons of oil. Do not put enough in to bring the oil to the top of the ELBOW, but just have it in sight.

The other connections, bearings and all rubbing parts should be oiled in the usual manner with MONOTYPE Type Mold Oil except the MOLD.

The MOLD itself, including the MOLD CLOSURE, is to be oiled with MONOTYPE Rule Mold Oil. An OIL CUP is provided for this purpose and the feed should be regulated to suit the material cast. The amount of oil required depends not alone on the product being cast but also on the grade of type metal being used, the heat of the metal, the amount of cooling water, the speed of casting, etc. The following figures may be taken as an average but must be varied to suit local conditions.

For casting fusion two-point material, a 6-pica stroke requires about one drop of Rule Mold Oil each 16 to 20 casts, an 8-pica stroke requires one drop each 12 to 15

casts. Six-point material, 6-pica stroke, requires one drop each 12 to 14 casts, an 8-pica stroke one drop each 10 to 12 casts. Twelve-point, 6-pica stroke requires one drop each 10 to 12 casts, and 8-pica stroke one drop each 8 to 10 casts.

For casting non-fusion column width material about 12 picas long, two-point requires about one drop of Rule Mold Oil to each 15 casts, six-point requires about one drop to each 12 casts, and twelve-point requires about one drop to each 10 casts. Longer lengths of non-fusion up to 15 picas may require a little more oil.

Be sure there is always oil showing in the oil cavity in the upper left end of the MOLD. From this cavity the oil feeds to the MOLD BLADE and MOLD CLOSURE. This is always sufficient to give ample lubrication to the MOLD except when first starting up with the MOLD cold, at which time a little Rule Mold Oil should be squirted on the MOLD BLADE and MOLD CLOSURE with the small oil can which is kept filled with Rule Mold Oil. The MOLD CLOSURE, although oiled from the same source, may occasionally require a drop of oil from the oil can.

Pump: There are two GAG PLATES 6 (Fig. 7) which are used to advance the timing of the PISTON stroke in relation to the closing of the MOLD by the MOLD CLOSURE. Whether one, or both of these GAG PLATES or neither of them are used depends on the product. Usually the product should first be tried without any GAG PLATES and then, if it shows hollow or the body not completely filled, try one or both GAG PLATES until the proper relation is found for that product. This result should then be recorded on the "Ready Reference Card."

The PUMP LATCH 16 on Fig. 7 is to be swung down into operating position at all times.

Cleaning the Pump: Clean the PUMP ARM regularly. This is described on page 36.

If the **Micrometer Stand** carrying the MICROMETER WEDGES 9 and 10 (Fig. 17) is taken off the MACHINE for any reason, be very careful not to reverse it when it is replaced. While the STAND will go on in the reverse position it will not in that position give correct operation.

The **Shifting of the Belt** is done by means of the screw-driver with the long slim blade which is inserted through one of the holes in the front of the BELT GUARD. This makes a simple and easy belt shifter.

Changing Molds: When changing MOLDS be sure to check the MATRIX-CARRIER TOGGLE LINK ADJUSTMENT (page 28). There is but one standard BLANK MATRIX (for 18-point a special one is used), therefore when changing height of slugs the TOGGLE LINK ADJUSTMENT must be remade, and also when changing from .030" to .065" depth of drive MATRIX.

Mold Holder Bolts: Do not tighten BOLTS 4, 6, 10, 19, 22, and 28 (Fig. 23) too hard. It is not necessary to tighten them enough to endanger breakage. They should be brought up to a good solid bearing but do not use force to tighten them. It is possible to tighten these BOLTS so hard that the MOLD BLADE may tend to hang up. The No. 83 Wrench should be used to tighten all BOLTS and SCREWS. The Speed Wrench used on these BOLTS is for the purpose of quickly removing and replacing these BOLTS and SCREWS when changing MOLDS but not for their final tightening for which use the small Wrench No. 83, as the Speed Wrench has too much leverage and will tend to strip the threads.

Starting after Mold Change: When starting casting after any MOLD change it is usually desirable to put on a Blank MATRIX, get the length and position of stroke correct and the MOLD warmed up to running temperature, then change to the MATRIX for the product desired.

Mold Blade Hanging Up: If the MOLD gives trouble when starting up and continues to hang up so that it cannot be properly operated, take the MOLD out of the MOLD CARRIER as described on page 13 and put it back again after having very carefully cleaned all surfaces. Any particles of metal or dirt left on the parts would tend to change the point size and give trouble with hanging up.

When Casting Non-fused Material, if the product comes out different length or position than the stroke for which the MOLD BLADE is set, so that the STACKER does not shear it at the joint, check the following which may be causing this condition.

Make sure the MOLD BLADE SPRING BOX has some compression on each end of its stroke. It does not have to be much but if there is no compression on one or both ends of the stroke it may cause variation in the length of stroke and in the product.

On material where the MATRIX is not raised, the MOLD BLADE may create a vacuum on its return stroke to the left and suck back a trifle the last piece of the product cast so that the next cast will be short. This may repeat regularly or may occur only at intervals. The remedy is to adjust the NUTS 9 and 11 (Fig. 21) on the front end of the TOGGLE LINK OPERATING ROD 10 so that the MATRIX will be raised just a slight amount each stroke to break the vacuum.

If the FRICTION SCREW 35 (Fig. 23) is too loose it may permit the product to jump forward under the pressure of the PISTON stroke or to be sucked back by the return stroke of the MOLD BLADE (see preceding paragraph).

If the CLAMPING SCREW 35 (Fig. 23) is too tight it may cause the MOLD BLADE to hang up and not be able to push the product the full length of its stroke. This is usually accompanied by a snapping of the parts

at times when the SPRING BOX loads up and suddenly lets go. At such times the product may be shot forward too far and give a long cast or a "squirt."

A MOLD too hot so that the product will not cool and free itself sufficiently to permit the BLADE to push it out, may cause hang-up of the BLADE and irregular product the same as described in the preceding paragraph.

Insufficient oil may also cause the MOLD BLADE to hang up. This of course is remedied by giving the BLADE more oil. Give an extra squirt of Rule Mold Oil from the hand oil can occasionally until the regular lubrication is sufficient to take care of this.

Improper oil will cause the MOLD to hang up. Use only "Rule Mold Oil" on these MOLDS. The use of any oil other than "Rule Mold Oil" will not only cause trouble in casting but it is also detrimental to the MOLDS themselves.

Speed Caution: Do not expect to start a new MACHINE or a new or repaired MOLD on the speeds given in the "Table of Speeds" (page 93). Run slower until the parts are worked in and satisfactory product is obtained. Then the speed can be gradually increased until the desired speed is obtained.

Clearing Closure or Freeze-up: If the MOLD CLOSURE stays forward instead of closing, it is usually because of a little button of cold metal collected behind it. To clear this out or to free a frozen NOZZLE proceed as follows:

Lower the MELTING POT one turn of the HANDLE below casting position. Have the MACHINE running, watch the MOLD CLOSURE 16 (Fig. 21) and throw in the PUMP HANDLE 24 (Fig. 19) long enough to give one stroke of the PUMP. Note whether the MOLD CLOSURE 16 (Fig. 21) closed, indicating that the button of metal behind it has been melted out. If not, give it another stroke of the PUMP. Seldom more than two strokes of

the PUMP are necessary to clear it. Then run the POT down and (using the bronze CLEANING ROD) clear away all squirted metal around the SHIELD, being very careful not to let the ROD come near the upper part of the CONE; for the NOZZLE SEAT and MOLD CLOSURE may be ruined if struck, even by the bronze tool furnished for use about the MOLD.

Spitting at the Nozzle: The high pressure and sudden cutting off of the flow of metal by the MOLD CLOSURE tends to cause a little spitting at the NOZZLE. Proper fitting and centering of the NOZZLE will usually take care of this. If a little spitting persists, it will do no harm if it does not interfere with the quality of product. If the spitting does interfere with the quality, and if the product still continues to come poor after all squirted metal has been cleaned from around the NOZZLE SEAT, this indicates the NOZZLE has not been properly fitted and centered (see "Nozzle Adjustments" on page 14).

Dross: Do not let the dross in the POT pile up too high or it will tend to heat the base of the MOLD HOLDER too much and cause trouble with the MOLD CLOSURE, resulting in poor product.

Small Point Sizes: If difficulty is experienced getting good product or fusion on small point sizes, cut down the quantity of water through the BOLSTER BLOCKS and keep on casting until the MOLD is heated up. On these small point sizes it may also be necessary to raise the temperature of the type metal. Good product on small point sizes depends on getting the right combination of MOLD and metal temperatures and speed of casting. The position and amount of CLOSURE opening and the number of GAG PLATES used also affect the product.

Fusion: Failure to fuse is usually a question of the temperature of the MOLD, although type metal not hot enough or not casting fast enough will have much the

same effect. If the MOLD is too cold the product will be of poor quality and the fusion not perfect. The water passages through the BOLSTER BLOCKS are large and permit such an abundant flow of water that the tendency is to get too much, especially during the winter months when the water itself is very cold. Of course it is essential that the right-hand position of the MOLD BLADE be at the proper place for a perfect weld (see "Casting length of Stroke" page 38).

Molds for 1-point: These MOLDS are of the fusion style, having the MOLD BLADE curved on the casting end, and are for leads only.

Greater care is required in casting 1-point than for the larger point sizes. When using MONOTYPE grade of type metal a temperature of about 775° will probably be found about right. Plenty of PISTON SPRING pressure must be used. The water should be cut down to the very minimum. The fastest speed, a stroke of 6 picas, and the No. 50 hole NOZZLE usually give the best results.

When running any other grade of type metal the above instructions must be modified to suit. The NOZZLE may have to be changed to the No. 47, or the speed or stroke or metal temperature may have to be modified. Not much success will be had with inferior or dirty metal under any conditions.

This 1-point material is so thin that it is best to cast it in full length strips and cut it to labor saving lengths on a saw.

Molds for 1½ to 3-point: These MOLDS are made in two styles, one for non-fusion and the other for fusion material. The non-fusion MOLD is equipped with a straight-end MOLD BLADE the same as larger point-size MOLDS used for both classes of product. Therefore, this non-fusion straight-end-blade MOLD is symbolized NR the same as other regular MOLDS. The fusion MOLDS are equipped with a MOLD BLADE which is

curved on the casting end to give better fusion. This MOLD carries the symbol NR2F (older style NRF – see Appendix).

A BLADE curved at both top and bottom is standard for fusion in sizes 3-point and smaller. These MOLDS are symbolized NR2F. The setting of the length of stroke of the BLADE and the position of the stroke on these MOLDS depends somewhat on the product to be cast. For leads leave the setting the same as for straight end BLADES. For rules, same as above except shorten the stroke on the left end so the end of the BLADE comes to the end of the rule face in the MATRIX. For decorative borders set the stroke by the GAGE 1 (Fig. 29).

It will be readily understood that these 3-point and smaller MOLDS can be used only for the product for which they are designed; that is, the Style NR (in 1½ to 3 point) with straight-end BLADE is for non-fusion only; while the style NR2F (and older style NRF) with curved-end BLADE is for fusion only. MOLDS 4 point and larger cast both fusion and non-fusion in one MOLD with one straight-end BLADE.

Borders: There is nothing difficult about casting fancy design borders if a few simple rules are followed:

(a) For fancy borders always use the second hole counting from the left in the BELL CRANK 1 (Fig. 18) as specified in the Table accompanying Fig. 18. Standard BORDER MATRICES are made for a MOLD BLADE stroke of 6 picas and it is absolutely necessary that this length of stroke be used.

(b) Use the MOLD-BLADE GAGE 1 (Fig. 29) for setting the MOLD BLADE stroke so that it will coincide with the beginning of the border at the left and will approximate as closely as possible the exact stroke of 6 picas desired. This setting to be made when assembling the MOLD before the front MATRIX GUIDE is put on, as has been already described. All standard fancy border MATRICES have the design positioned the same

distance from the left end of the MATRIX, which calls for positioning the MOLD BLADE stroke as described.

(c) A few difficult to cast borders, such as lithotones are made for 4-pica stroke and the settings must be altered accordingly.

(d) The exact MICROMETER ADJUSTMENT for the length of stroke must be made from an examination of the product under a glass after a few casts have been made. (See *Decorative Borders*, page 44.) This adjustment must be again checked by an examination of the product after the casting has proceeded long enough so that all parts are heated and operating under normal running conditions. This adjustment should be checked from time to time during the run to be sure it has not changed due to changing conditions of running. The fancy border MATRICES are made so that there is a repeating part of the design at the right end of the drive which will overlap the left end of the previous cast and thus seal the MOLD for the next cast. This overlapping portion must seat so as to match exactly the design on the end of the previous cast. An examination of this joint in the face, by means of an eye glass, will reveal the position of the MATRIX seating on the end of the previous cast relative to the design—that is, whether it is positioned correctly or is too far to the right or left. A little experience will enable the operator to readily detect in which direction the right end of the stroke should be moved to make the design exactly match. (See “Decorative Borders,” page 44.)

(e) Either the No. 43 single-hole offset NOZZLE or one of the three-hole NOZZLES (No. 7 or No. 8) usually gives the best results on fancy borders.

Flush Side Mold, Style NRB: These MOLDS have the TYPE BLOCKS more than type high. A special style of male MATRIX must be used. The part of this MATRIX which goes down between the TYPE BLOCKS is the point size of the MOLD so that it just fits between the

TYPE BLOCKS and it carries on the lower edge the face to be cast. Depending on the MATRIX used the product from this MOLD is cast flush to one side or both sides without any trimming.

Trimmer Molds, Style NR2G: These MOLDS have a long right POINT BLOCK which projects beyond the MOLD. On each side of this extended POINT BLOCK is mounted a TRIMMER which trims off anything hanging over either side of the body from shoulder to face.

Any face can be made flush to the side on this MOLD by moving the MATRIX GUIDES toward the rear by the amount of the bevel on the drive of the MATRIX. The face is then cast with the bevel overhanging and it is trimmed off by the rear TRIMMER, leaving the face flush to the side.

To cast full face flush to both sides material, select a full face MATRIX of the next larger point size than the body desired, move the MATRIX GUIDES back half a point (half the difference between the point size of the MATRIX and the point size of the MOLD) and the TRIMMERS will trim the overhanging bevel from both sides, leaving the product full face, flush to both sides. For example, on 6-point NR2G MOLD use a 7 point full face MATRIX with MATRIX GUIDES moved back half a point to obtain rule flush to both sides.

GENERAL CAUTIONS

DON'T have the MATRIX GUIDES 7 and 27 (Fig. 23) too tight against the MATRIX that must lift; it will score the MATRIX and the GUIDES; use the GAGE 1 (Fig. 29) to set the GUIDES.

DON'T have the MATRIX GUIDES 7 and 27 (Fig. 23) too loose on one or both ends—especially for the MATRIX that must lift; it will let the MATRIX twist so it will not match the design, causing poor product and a squirt; use the GAGE 1 (Fig. 29) to set the GUIDES.

DON'T run new or repaired MOLDS too fast at the start. It is better to run them slower than rated speed until they are broken in.

DON'T have the CLOSURE opening too large—start with a 2-point opening for all sizes and styles of product (2 point and larger) and usually it will not be necessary to increase this. The bevel on the CLOSURE and STOP PLATE must act to spray the metal in a thin sheet to the ends of the MOLD cavity.

DON'T tap the CLOSURE OPERATING ROD. If a button of metal collects behind the CLOSURE, melt it out by dropping the NOZZLE one turn of the POT RAISING SCREW while the PUMP is in action.

DON'T take MOLDS apart unless necessary. They are carefully assembled in the factory by skilled workmen using special jigs. An operator, by following directions under "Material Making Machine Molds" (page 59), can clean and readjust a MOLD after some practice, but it requires care and skill.

DON'T fail to oil the MOLD BLADE, MOLD CLOSURE, and BEARINGS of MATRIX in MATRIX GUIDE by hand when starting. When operating under regular running conditions, regulate the OILER to the the material being cast. (See "Oiling," page 66.)

DON'T use anything but MONOTYPE "Rule Mold Oil" on MATERIAL MAKING MOLDS. The oil we recommend and sell as "Rule Mold Oil" is a special oil. The use of any other oil on STRIP CASTING MOLDS is dangerous and will cause trouble with casting or with the MOLDS themselves.

DON'T have the metal too hot. Some metals can be run at lower temperature than shown on the chart, which is based on MONOTYPE metal.

DON'T expect instantaneous results from a change in water regulation; it takes several minutes for the full effect of any change to show in the product.

EXPLANATION OF MATRIX SYMBOLS

The following explains and illustrates the principal symbols used in designating MATERIAL MAKING MACHINE MATRICES.

STRAIGHT LINE RULES

- (1) FIRST SYMBOL indicates MINIMUM SIZE OF BODY—
The first symbol is in figures, and indicates the smallest body size on which the rule face can be cast. A MATRIX that can be cast on a 2-point body will be symbolized for a 2-point body, even if it is ordered for a body of larger size. This is because MATRICES for the MATERIAL MAKING MACHINE may be cast on any body size larger than the one for which they are symbolized.
- (2) SECOND SYMBOL indicates USE OF MATRICES—
The second symbol is the letter "M" and is never changed. It indicates that the MATRIX is made for use on the MONOTYPE MATERIAL MAKING MACHINE and that it can be used on no other MACHINE.

- (3) **THIRD SYMBOL** indicates DESIGN—
Each rule face in our SPECIMEN BOOK for use on any MONOTYPE MACHINE has a design symbol. For instance, a hairline on the side of the body is symbolized "11." These same symbols are used in marking rule MATRICES for the MATERIAL MAKING MACHINE.
- (4) **FOURTH SYMBOL** indicates CLASSIFICATION—
The fourth symbol is the letter "L," and indicates the MATRIX is for casting straight line rules.
- (5) **FIFTH SYMBOL** indicates LENGTH OF FUSION CAST—
This symbol indicates the proper length of fusion cast (MOLD BLADE stroke) in nonpareils and is always "12" except for a few difficult borders which are made 8 nonpareils stroke. MATRICES for non-fusion, or single casts, omit this symbol because with them the length of cast can be varied to suit requirements.

EXAMPLE: 2M11L12—This Symbol indicates that (2) the smallest point size on which the MATRIX can be cast is 2-point; that (M) it is for the MATERIAL MAKING MACHINE; that (11) the design is a hairline on the side of the body; that (L) it belongs to the classification of straight-line rules; and that (12) the length of fusion cast is 12 nonpareils.

DECORATIVE BORDERS

- (1) **FIRST SYMBOL** indicates MINIMUM SIZE of BODY—
Same as in "Straight Line Rules," above.
- (2) **SECOND SYMBOL** indicates USE of MATRICES—
Same as in "Straight-line Rules," above.
- (3) **THIRD SYMBOL** indicates DESIGN—
Same as in "Straight-line Rules," above; except that different numbers are assigned to decorative borders.

- (4) **FOURTH SYMBOL** indicates CLASSIFICATION—
The fourth symbol is the letter "N," indicating that the MATRIX is to be used for casting decorative borders in strips.

EXAMPLE: 6M594N—This symbol indicates that (6) the smallest point-size on which the border can be cast is 6 point; that (M) it is for the MONOTYPE MATERIAL MAKING MACHINE; that (594) it is design No. 594, shown in our SPECIMEN BOOK; and that (N) it belongs to the classification of decorative borders.

SINGLE COLUMN DASHES

- (1) **FIRST SYMBOL** indicates MINIMUM SIZE of BODY—
Same as in the "Straight Line Rules" as above. Exception: A few dashes have the face near the side of the body. In such cases the first symbol consists of two numbers divided by a hyphen, as 2-6. The first number indicates the width of body on which the face would center if it could be cast on that width body; but because of wide bevel on one side to support the face the dash must be cast on a wider body (in this case a minimum of 6 points with the face 1 point from the side).
- (2) **SECOND SYMBOL** indicates USE of MATRIX—
Same as in "Straight Line Rules," above.
- (3) **THIRD SYMBOL** indicates DESIGN—
Same as in "Straight Line Rules," as above; except that different numbers are assigned to single column dashes.
- (4) **FOURTH SYMBOL** indicates CLASSIFICATION—
In this case the symbol is always the letter "Z," and indicates that the MATRIX is for single-column dash whose face is shorter than its body. (In casting single-column full-length dashes, or

"cut-off rules," MATRICES having a short HEAD BEARING are used with the non-fusion method of casting.

- (5) **FIFTH SYMBOL** indicates LENGTH OF FACE OF DASH—This symbol indicates the length of the face of the dash in nonpareils. Thus, the symbol "12," would indicate that the face of the dash is to be 6 picas long. Length of the body of the dash is not indicated in the symboling, since the length may be varied, to a certain extent. Table shown on facing page gives the longest and shortest body on which a dash of any given length face can be cast central from a MATRIX of the style shown in Fig. 28, Plate IV. If cast off center, the maximum there shown cannot be obtained but the minimum still obtains. To get shorter length body than shown in the Table requires a MATRIX with a clearance cut in the right end. This at the same time reduces the maximum length obtainable. **Therefore, when ordering a Cut-off Dash Matrix be sure to specify the length of body wanted as well as the face.**
- (6) **SIXTH SYMBOL** indicates SIDE DASH—This symbol is used only where the face of the dash is to be cast flush to the end (lengthwise) of the body. It is the letter "a," and is invariable whenever used.
- (7) **SEVENTH SYMBOL** indicates LENGTH OF BODY OF DASH—Where the sixth symbol (above) is omitted, this seventh symbol also is omitted. Where the sixth symbol is used (indicating that the face on the dash is to be cast flush to the end of the body) this seventh symbol indicates in figures the nonpareil length of the body of the dash. A separate MATRIX is required for each body length.

TABLE OF CUT-OFF DASHES
(See Fig. 28 Plate IV)

Length of Face (A) in Picas	Maximum Length of Body in Picas	Minimum Length of Body in Picas
2†	15	9½
3†	15	10
4†	15	10½
5†	15	11
6†	15	11½
7†	15	12
8†	15	12½

†Double this for nonpareil marking on MATRIX.

The examples used as illustrations in this Table are chosen as being typical but the numerals in the MATRIX symbols will vary according to point size, design of face, and length of stroke.

EXAMPLE: 6M1Z14a—The first figure indicates that (6) the face is to be centered on a 6-point body, and also that it can be cast on a 6-point body, that (M) it is for the MATERIAL MAKING MACHINE; that (1) it is a hairline; that (Z) it is a single-column dash whose face is shorter than the body on which it is to center lengthwise; that (14) the face is to be 14 nonpareils long and that (a) the face is to be cast flush (lengthwise) to one end of the body.

EXAMPLE: 2-6M1Z10—The first figure indicates that (2) the MATRIX would be centered on a 2-point body (if it could be so cast) but that (6) it cannot be cast on any body smaller than 6 point and it will, of course be off center on that body; that (M) it is for the MONOTYPE MATERIAL MAKING MACHINE, that (1) it is a hairline rule; that (Z) it is a single-column dash with a face shorter than its body; and that (10) the face is 10 nonpareils long. This MATRIX, like all MAT-

RICES for the MONOTYPE MATERIAL MAKING MACHINE, can be cast on any body larger than its minimum size (6 point), and if cast on a larger body the face will remain the same distance from the side of the body as on its minimum body.

LOGOTYPE ATTACHMENT

This attachment is used on the MATERIAL MAKING MACHINE for casting a slug with characters on one edge similar to the slugs produced on slug composing machines. In fact slug machine MATRICES are used to produce the characters with this attachment.

The length of slug can be varied to suit requirements but the maximum length is 15 picas and the shortest length is usually about 5 picas.

The printing face may be the full length of the body or may be as much less than the body length as desired. The face may be placed anywhere on the body although the nearer the middle, the easier it is to get good faces.

These LOGOTYPES are used for such purposes as stubs for stock tables, for baseball scores, for financial and racing news; also for headings of various kinds and for many other specialties. Any point size up to 18-point can be furnished but 5-point is the smallest regularly supplied. For 18-point the EIGHTEEN-POINT ATTACHMENT (which see) is of course required.

The equipment consists in general of a special MATRIX CARRIER, TOGGLE LINK, MOLD HOLDER, CUTTER BRACKET (for short casts), SHEAR BLADE, CUTTER ROCK SHAFT, STACKER BAR, NOZZLE, WATER PIPE EXTENSIONS and GAGE.

The NOZZLE is symbolized c14H27 and is numbered 9. It has 3 holes and is the same as No. 5 (Fig. 27) except the holes do not have as much angle.

The MOLDS are style NRG. They are similar to Style NR2G MOLDS (see TRIMMER MOLDS, page 75) except for height and clearance cuts for the ears of the slug MATRICES. They are provided with TRIMMER KNIVES to shave any overhanging bevel from both sides of the product as it comes from the MOLD and are of the proper height (.875") to produce a logotype slug of type height from slug machine MATRICES.

In addition to casting non-fusion slugs as described above, this same MOLD will also cast continuous strip material the same as regular MOLDS—slugs .875" high from a BLANK MATRIX and rules from special .043" drive rule MATRICES.

The directions for placing the MOLD in position on the MACHINE and adjustment of the CLOSURE and STOP PLATE are the same as for other MOLDS of like point size.

The GAGE a25L2 is provided for setting the MOLD BLADE in the left hand position to correspond to the head bearing of the MATRICES assembled in the MATRIX CARRIER and to give proper clearance between the MATRIX GUIDES.

The usual procedure is followed for casting material either fusion or non-fusion as desired.

EIGHTEEN-POINT ATTACHMENT

The following are all special for 18-point: MOLD, SPEED DEVICE, REAR MATRIX GUIDE, NOZZLE, BLANK MATRIX, CUTTER BRACKET and ROCK SHAFT—also for MACHINES prior to No. 10461 the new style SHEAR BLADE and GUIDE must be supplied.

Eighteen-point strip material MOLDS are all made of the tie-up slug style with a recess 6 points deep in the front side. MOLDS .888" high for use with standard rule

MATRICES and MOLDS .875" high for logotypes (see LOGOTYPE ATTACHMENT) are equipped with TRIMMERS for casting with overhanging bevel and trimming to make the face flush to the side if desired.

The special SPEED REDUCING DEVICE (Fig. 36) is required for slowing down the casting speed, below that which can be obtained on the standard MACHINE. This device can readily be applied to any MATERIAL MAKING MACHINE.

The special rear MATRIX GUIDE is to move the MATRICES forward 6 points if it is desired to position 12-point faces close to the front side of the 18-point body or to make 6-point central faces central on 18-point body.

A special NOZZLE symbolized d14H13 and numbered 31 (the offset hole in the tip being the size of No. 31 drill) is used with the offset toward the front.

A special CUTTER BRACKET for short leads and corresponding CUTTER ROCK SHAFT are needed.

For MACHINES prior to 10461 the new style standard SHEAR BLADE and GUIDE are necessary as this GUIDE has larger opening to permit the 18-point material to pass through the GUIDE.

The standard settings for CLOSURE and STOP PLATE are to be followed.

The speed will vary with the material being cast and the METAL being used. It can be best determined by trial and will usually average from 18 to 25 r.p.m.

Water regulation is about the same as for 12-point material.

The standard instructions for setting of MOLD BLADE and length of stroke and matching of border MATRICES are to be followed.

APPENDIX

This appendix contains information about MACHINES prior to No. 9415 on which some of the parts and their adjustments differ from the present style. If one of these earlier MACHINES has been brought up to date by having the improved parts applied to it, this appendix is to be disregarded and the adjustments made as given in the main part of this book.

PUMP CONNECTING ROD

One Adjustment—Length of Rod 27 (Fig. 5).

Object: That the CROSSHEAD 14 (Fig. 4) shall not hammer on its ABUTMENT 15.

PROCEDURE

With PUMP HANDLE 38 (Fig. 5) thrown in as shown and the MACHINE at rest, make the length of Rod 27 such that the CROSSHEAD 14 (Fig. 4) will just clear its ABUTMENT 15. This clearance should be from $\frac{1}{16}$ " to $\frac{1}{8}$ ".

After making adjustment and with Rod 27 (Fig. 5) locked with its LOCK NUTS 28 and 33 on each end, swing the HANDLE 38 up and down a few times to make sure it enters properly the square hole in the SPRING CLIP 35. If it does not enter the square hole in this SPRING CLIP properly, loosen the LOCK NUT 33 and tighten it again after moving the SPRING CLIP 35 in the desired direction to bring its hole in line with the LATCH.

PISTON

Two Adjustments

First: Position of STOP 43 (Fig. 5).

Second: Position of STOP NUT 25.

Both these adjustments may be considered together.

Object: That the PISTON may be clamped tightly against its upper STOP at all times except when the NOZZLE is in contact with the MOLD.

PRELIMINARY

With the MACHINE in the position of rest back off the two NUTS 25 and 26 (Fig. 5), loosen LOCK NUT 48 and screw down the STOP 43. The PUMP HANDLE 38 is to be thrown into operating position as shown in Fig. 5.

PROCEDURE

Screw up the STOP 43 (Fig. 5) until it just touches the CROSSHEAD 45 and then screw it up one-half turn further. At this point the PIN 6 (Fig. 6) will stand central in the hole in the PISTON LEVER 7. This is indicated by the fact that the PIN 6 can be revolved freely with the fingers. Tighten the NUT 48 (Fig. 5) and see that the adjustment holds.

With the fingers, screw the NUT 25 (Fig. 5) just up to bearing and tighten LOCK NUT 26 against it.

LATCH

One Adjustment—To clear its PLATE.

Object: That the LATCH 16 (Fig. 7) shall clear its PLATE 19 when the PISTON is at the top of its stroke.

PROCEDURE

With the MACHINE in the position of rest adjust NUT 14 (Fig. 7) and lock it with its LOCK NUT 13 to give $\frac{1}{16}$ " clearance between the LATCH 16 and its ABUTMENT PLATE 19.

PUMP-BODY OPERATING ROD

Two Adjustments

First: Position of LEVER 2 (Fig. 9).

Second: Position of STUD 5 (Fig. 8).

Object: That the NOZZLE shall be seated before the PISTON starts on its down-stroke.

PROCEDURE

Consider these two adjustments together. With the MACHINE at rest adjust the NUT 6 (Fig. 9) and lock it with its LOCK NUT 5 so that the LEVER 2 clears the PISTON LEVER 1 by $\frac{1}{16}$ " when the front of the LEVER 2 is swung as far to the left as possible.

Swing the two PLATES 6 (Fig. 7) into position beneath the LATCH 16 and turn the MACHINE until these GAG PLATES 6 come within $\frac{1}{32}$ " of the LATCH 16. In this position adjust the STUD 5 (Fig. 8) so that its lower end clears the LEVER 7 by $\frac{1}{16}$ ". Lock the STUD 5 in this position with its NUT 6.

Caution: Be careful not to screw the STUD 5 down too far for if this is done it will prevent the PISTON returning to the top of its stroke, the LATCH 16 (Fig. 7) will not engage the PLATE 19, and a squirt or other trouble will result. A wrong adjustment of this STUD 5 may be easily mistaken for a sticky PISTON. If the PISTON seems to stick, so that it does not rise to the top of its stroke, test first the adjustment of this STUD.

PISTON SPRING

One Adjustment—Position of NUT at upper end of PISTON SPRING ROD.

Object: To give proper PISTON pressure.

PROCEDURE

Screw up or down the NUT on the upper end of the PISTON SPRING ROD 1 (Fig. 7) to give just sufficient pressure to get solid product. Do not use more pressure than is necessary.

Caution: Never screw this NUT down so that the ROD sticks through the NUT more than $1\frac{1}{4}$ ". If screwed down any further than this, the SPRING will compress until it is solid, as the MACHINE is turned over, and will not only cause trouble in the cast but will also break or damage the MACHINE as well.

NOZZLE

Two Adjustments

First: To insure that the axis of the NOZZLE is in a vertical position.

Second: To center the NOZZLE in the MOLD opening.

First

Object: That the axis of the NOZZLE when entered in the NOZZLE SEAT will be perpendicular to the MOLD, so that there will be a tight joint between the NOZZLE SEAT and the NOZZLE.

PRELIMINARY

Remove the MATRIX GUIDES, BOLSTERS, MOLD, CLOSURE, CLOSURE STOP PLATE, STOP PLATE WEDGE, CLOSURE GUIDE PLATES, WEDGE ABUTMENT, NOZZLE SEAT, PISTON, and NOZZLE.

Raise the MELTING POT into position and with the PUMP TRIP released, turn the MACHINE to bring the PUMP up into casting position.

Screw the NOZZLE SQUARING PIN 15H (Fig. 30) into the PUMP in place of the NOZZLE.

Caution: See that the PIN 15H is started squarely in the PUMP and screwed down until its shoulder is seated.

PROCEDURE

Loosen NUT 28H5 (Fig. 31) and move the NUT 28H4 up or down on the ROD a28H until the PIN 15H (Fig. 30) is square with the top of the MAIN STAND. Test this in front and rear with a square resting on the top surface of the MOLD BASE. One of the MATRIX GUIDES 7 or 27 (Fig. 23) makes an excellent square for this purpose. Tighten the LOCK Nut 28H5 (Fig. 31) and test again with the square, to see that the adjustment holds.

NOTE: The PIN 15H (Fig. 30) will stand square, right and left unless the PUMP BODY or its LIFTING LEVER are badly worn, in which case they should be renewed.

Remove the SQUARING PIN 15H.

Second

Object: That the NOZZLE B (Fig. 32) will enter the conical hole in the NOZZLE SEAT (C) without dragging on the side of the CONE.

PRELIMINARY

Screw NOZZLE B (Fig. 32) in place. Replace NOZZLE SEAT C.

Caution: See that the PISTON is removed to avoid any possibility of a "squirt" of hot metal.

Lower the MELTING POT and loosen the two NUTS a12H10 (Fig. 33) which hold the POT to the SWING FRAME.

Caution: The SCREW 12H8 should never be loosened; the hole in which it is located is large enough to allow a slight movement for this adjustment.

Back off the two SCREWS a37H10 and SCREW a37H9 (Fig. 33). Place a packing between the top OPERATING-ROD NUT 28H4 (Fig. 31) and OPERATING-ROD LEVER 29H so that when PUMP is raised the NOZZLE will stand about $\frac{1}{16}$ " below its position for contact with the MOLD. Raise the MELTING POT into position. With the PUMP TRIP released, slowly turn the MACHINE to casting position, noting the travel of the NOZZLE on its up-stroke.

PROCEDURE

By moving the PUMP on its supports inside the POT to the right and left, and to the front and rear (use the large screw-driver to move it) the NOZZLE can be seen to move slightly to one side or the other of the conical hole in the NOZZLE SEAT. The position of the POT must be adjusted so that this slight movement of the NOZZLE is equal in each direction from the center of the conical hole in the NOZZLE SEAT.

To approximately center the NOZZLE, move the complete MELTING POT on the SWING FRAME by means of the large screw-driver used as a lever. Tighten the front NUT a12H10 (Fig. 33). Lower the POT, tighten the rear NUT a12H10 and bring the SCREWS a37H10 and the SCREW a37H9 up to bearing.

Raise the POT into casting position to test the adjustment and, if necessary, make further adjustment by means of the two SCREWS a37H10 and the SCREW a37H9, first backing off the two NUTS a12H10.

To move the NOZZLE to the front, back off equally the SCREWS a37H10 and turn the SCREW a37H9 in until all three SCREWS come to bearing.

To move the NOZZLE to the rear, turn the SCREW a37H9 out and screw in equally the SCREWS a37H10 until all three SCREWS come to bearing.

To move the NOZZLE to the right, back off the right SCREW a37H10 and tighten the left SCREW a37H10.

To move the NOZZLE to the left, back off the left SCREW a37H10 and tighten the right SCREW a37H10.

When the NOZZLE is centered tighten the NUTS a12H10, and be sure the SCREWS a37H9 and a37H10 have been all brought up to bearing.

Remove the packing piece from between NUT 28H4 and LEVER 29H (Fig. 31).

Replace all parts removed.

MOLDS FOR $1\frac{1}{2}$ TO 3 POINT

Old style BLADES in $1\frac{1}{2}$ to 3 point, curved only at the top (NRF MOLDS), are shorter than the straight-end BLADE by $\frac{1}{8}$ " so that, when the stroke is positioned correctly by means of GAGE 1 (Fig. 29) for the straight end BLADE, it will be $\frac{1}{8}$ " further to the left when this old style curved end BLADE is used without changing the setting. This brings the fusion point $\frac{1}{8}$ " nearer the NOZZLE opening, which is the purpose of shortening the BLADE. When casting rules with this single curved-end BLADE the stroke to the left will have to be readjusted to shorten it $\frac{1}{8}$ " so as to match the drive in the MATRIX but for leads this is not necessary. The right end of the stroke of either leads or rules with the curved-end BLADE may need slight readjusting to bring it a little nearer the NOZZLE for the best fusion results.

AUTOMATIC CUTTER FOR CONTINUOUS STRIPS

The earlier CUTTERS were provided with a SPRING CLIP 3 (Fig. 11).

In making the adjustment of the TRANSFER BARS 7 and 8 (Fig. 13) this SPRING CLIP is removed and the regular adjustment made, and when finished the SPRING CLIP is replaced.

NOTE: The SPRING CLIP should put no tension on 2-point material when the TRANSFER BARS are at the rear at the end of the stroke.

POINT SIZE	PRODUCT	CAST IN SPEED IN BELT & GEAR, K. P. M.	TEMPERATURE	SUGGESTED NOZZLES
2	Continuous Strip Leads—Low or High	6 to 8	600°	No. 50 or 42 hole or 2-hole No. 4
	Continuous Strip Rules and Barrels	6		No. 50 or 42 hole or 2-hole No. 4
	Cut-off Dies	10 to 15	700°	No. 50 or 42 hole or 2-hole No. 4
	Column Width Leads—Low or High	10 to 15		No. 50 or 42 hole or 2-hole No. 5
6	Continuous Strip Slugs—Low or High	8 to 8.1	575°	No. 43 (offset rear) or 3-hole No. 7 or No. 8
	Continuous Strip Rules	6		No. 43 (offset rear) or 3-hole No. 7 or No. 8
	Continuous Strip Barrels	6	650°	No. 43 (offset rear) or 3-hole No. 7 or No. 8
	Continuous Strip Dies	6		No. 43 (offset rear) or 3-hole No. 5
12	Center Piece Cut-off Dies	10 to 15	575°	No. 43 (offset rear) or 3-hole No. 5
	Column Width Slugs—Low or High	10 to 15		No. 43 (offset rear) or 3-hole No. 5
	Continuous Strip Slugs—Low or High	6 to 8.1	625°	No. 43 (offset front) or 3-hole No. 7 or No. 8
	Continuous Strip Rules	6		No. 43 (offset front) or 3-hole No. 7 or No. 8
12	Cut-off Dies	10 to 15	625°	No. 43 (offset front) or 3-hole No. 5
	Column Width Slugs—Low or High	10 to 15		No. 43 (offset front) or 3-hole No. 5

On face material the left end of the stroke is determined by the handle being raised and the material being drawn toward the blade until it comes to the left end of the drive in the MATRUX.

In addition to the two regular head bearings, some MATRICES for continuous strip have a third head bearing, which is used to support the MATRUX with the Head Bearing Gears (10 to 20) to see where the head of the drive comes, before setting the stroke.

NOTE: Head-bearing in the clearance from the left end of the driven shaft to the MATRUX should be about 1/2" which gives the longer bearings in use; a short head bearing of about 1/4" which gives the longer stroke.

As a standard part of our equipment we furnish five Nozzles as follows: c14H10 Single No. 50 hole; c14H11 Single No. 47 hole; c14H22 Single No. 44 hole; c14H23 Single No. 41 hole; c14H24 Three hole—numbered "8" (Eaton).

For casting two-point wave-line borders on INR2F Motors having c14H10 Single No. 50 hole and c14H11 Single No. 47 hole is required; this is two-hole and numbered "4".

For center piece cut-off dies, special Nozzle c14H17 is required; this Nozzle is two-hole and numbered "4".

Machines No. 8915 and following and all prior Machines that have been equipped with the Griston Cast For or 4400 wane Electric Por Nozzles, No. 8915 and following, should be equipped with the No. 8915 Nozzles.

Not all the above Nozzles may be required in any one plant. The wide variety is furnished to meet all most conditions. Different kinds of material may require different Nozzles. The correct Nozzle for each suggested for each product, unless it fails to give satisfactory results, when other Nozzles should be tried until the correct Nozzle for each material is found. The correct Nozzle should be recorded on the Ready Reference Card. This should then be recorded on the Ready Reference Card.

NOTES

NOTES

Figure 1

Part No.	Sym.	Name
1	15H1	SQUARING PIN
2	Xa23H20	PUMP BODY
3	a23H35	PLUG

Figure 2

Part No.	Sym.	Name
1	a26H6H	LIFTING LEVER (goosle end)
2	a26H7	FULCRUM PIN
3	a14H10	NOZZLE (see Fig. 27)
4	b252E1	BASE PLATE
5	a12H12	MELTING POT (gas)
6	a12H18	POT CASING
7	a12H18	ADJ. LUG (left)
8	a37H19	ADJ. SCREW (2)
9	a37H18	TABLE
10	a23H16	NUT (2)
11	a23H24	STOP PLATE (upper)
12	a23H12	STOP PLATE (lower)
13	a23H17	SLEEVE (3)
14	Xa23H20	PUMP BODY
15	a25H11	PIN
16	a25H10	FULCRUM PIN
17	a25H8	LIFTING LEVER (goosle end)
18	a25H9	CLAMP SCREW
19	b6H1	ADJUSTING PIN
20	a12H18	ADJ. LUG (right)
21	a37H19	ADJ. SCREW (2)
22	a37H20	STUD
23	Xa25H14	GAS BURNER
24	a12H18	SCREW (3)
25	a12H19	WASHER (5)
26	a25E2	NOZZLE SHAFT
27	a25E3	GUIDE PLATE (right)
28	a25E3	GUIDE PLATE (left)

Figure 3

Part No.	Sym.	Name
1	a28H12	LOCK NUT
2	a28H11	NUT
3	29H1	LEVER
4	a37H18	BUSHING
5	a28H13	WASHER
6	a28H14	NUT
7	a28H15	LOCK NUT
8	a28H10	NUT
9	a28H9	WASHER
10	b37H1	SWING FRAME
11	a28H8	EXTENSION
12	29H1	PIN
13	29H3	STAND
14	a28H7	ROD
15	a26H6H	LIFTING LEVER (goosle end)

Figure 4

Part No.	Sym.	Name
1	31H10	NUT (upper)
2	31H2	CROSSHEAD
3	a31H11	SLEEVE (3)
4	31H1	ROD
5	a31H11	SLEEVE (3)
6	a31H15	ABUTMENT (2)
7	a31H14	SPRING
8	a31H15	ABUTMENT (2)
9	a31H11	SLEEVE (3)
10	c218E1	MAIN STAND
11	31H13	NUT (2)
12	31H13	NUT (2)
13	19H4	NUT

PLATE I

14	a19H13	CROSSHEAD (upper)
15	c218E1	MAIN STAND
16	a19H1	OPERATING ROD
17	68H11	CONNECTING ROD
18	68H12	LOCK NUT
19	68H11	EYE (rear)
20	68H13	PIN
21	a67H1	BELL CRANK
22	69H1	SHAFT
23	19H2	DOWEL
24	a19H18	CROSSHEAD (lower)

Figure 5

Part No.	Sym.	Name
1	a20H11	ROD
2	a20H9	SPRING (outside)
3	13H1	CHEMNEY
4	a21H2	SHAFT
5	62H15	LOCK NUT
6	62H4	NUT
7	62H11	LATCH STAND
8	a62H18	SPRING
9	58H11	LATCH ABUTMENT
10	59H1	SPRING
11	a28H12	OPERATING ROD
12	a28H12	LOCK NUT
13	a28H11	NUT
14	29H1	LEVER
15	29H3	STAND
16	a31H11	SLEEVE (3)
17	a31H15	ABUTMENT (2)
18	31H14	SPRING
19	b37H1	SWING FRAME
20	a31H15	ABUTMENT (2)
21	a31H11	SLEEVE (3)
22	a67H1	BELL CRANK
23	a19H18	CROSSHEAD (lower)

24	a66H1	OPERATING ROD (3/H)
25	31H13	STOP NUT (2)
26	31H13	STOP NUT (2)
27	68H11	CONNECTING ROD
28	68H12	LOCK NUT
29	68H11	EYE (rear)
30	68H13	EYE PIN
31	68H14	COTTER (2)
32	69H1	SHAFT
33	68H10	LOCK NUT
34	24E2	PIN
35	68H10	SPRING CLIP
36	68H3H	GAS BLOCK
37	a68H14	FULCRUM PIN
38	68H16H	HANDLE
39	68H12	EYE (front)
40	24E1E	PUMP CANE LEVER
41	a23E1	FULCRUM PIN
42	57H1	LATCH
43	31H8	STOP
44	10H4	NUT
45	a19H13	CROSSHEAD (upper)
46	c218E1	MAIN STAND
47	31H2	CROSSHEAD
48	31H9	NUT
49	a19H1	OPERATING ROD
50	a20H7	SPRING (inside)

Figure 6

Part No.	Sym.	Name
1	a17H13	PISTON
2	a23H26	NUT (2)
3	a23H24	STOP PLATE (upper)
4	a23H12	STOP PLATE (lower)
5	a23H24	STOP (2)
6	32H1	PIN
7	a18H1	PISTON LEVER
8	32H3	PLUNGER
9	32H4	SPRING

10	32H1	LINK
11	31H8	STOP
12	a19H3	CROSSHEAD (upper)
13	31H10	NUT (upper)
14	31H1	CROSSHEAD
15	31H5	PIN
16	31H1	ROD
17	a24H1	LEVER

Figure 7

Part No.	Sym.	Name
1	a20H11	ROD
2	a20H7	SPRING (inside)
3	a20H9	SPRING (outside)
4	a20H10	ABUTMENT
5	a21H2	STUD
6	a21H1	GAS PLATE (2)
7	a19H3	STUD
8	a19H7	LOCK NUT
9	a19H13	CROSSHEAD (upper)
10	58H1	ABUTMENT
11	31H4	NUT
12	62H2H	SHAFT
13	62H3	LOCK NUT
14	62H4	NUT
15	62H11	LATCH STAND
16	57H1	LATCH
17	a62H18	SPRING
18	a57H4	LATCH PLATE
19	58H2	ABUTMENT PLATE
20	58H4	SCREW
21	59H1	SPRING
22	a20H12	ROD EYE
23	a31H3	CROSSHEAD EYE

Figure 8

Part No.	Sym.	Name
1	a19H	ROD
2	19H4	NUT
3	31H8	STOP
4	a19H13	CROSSHEAD (upper)
5	a19H1	STUD
6	a19H7	LOCK NUT
7	29H1	LEVER

Figure 9

Part No.	Sym.	Name
1	a18H	PISTON LEVER
2	29H1	LEVER
3	29H1	PIN
4	a28H7	ROD
5	a28H12	LOCK NUT
6	a28H11	NUT
7	29H3	STAND

Figure 10

Part No.	Sym.	Name
1	c14H10	NOZZLE (See Fig. 27)
2	a14H12	LOCK NUT
3	a23H11	PLUG
4	a17H13	PISTON
5	Xa23H20	PUMP BODY
6	a37H18	BUSHING
7	a23H31	VALVE PLUG (side)
8	a23H28	PLUG (bottom)
9	a23H24	NUT
10	a23H33	REGULATING SCREW
11	a23H31	VALVE SEAT
12	a23H29	VALVE
13	a23H30	VALVE PLUG (bottom)

MELTING POT AND PUM

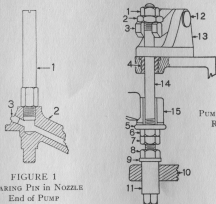


FIGURE 1
SQUARING PIN IN NOZZLE
END OF PUMP

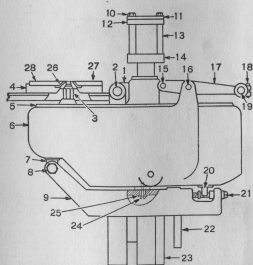


FIGURE 2
MELTING POT WITH SWING
FRAME, PUMP, LEVERS
AND BURNERS

FIGURE 3
PUMP-BODY OPERATING
ROD MECHANISM

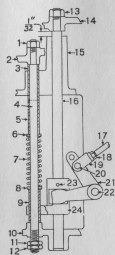


FIGURE 4
PUMP-BODY-SPRING ROD, PISTON
OPERATING ROD, AND PUMP
BELL CRANK MECHANISM

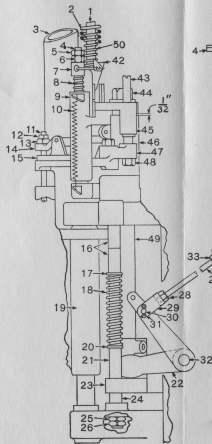
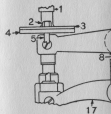


FIGURE 5
MECHANISM FOR OPERATING, ADJUSTING,
AND CONTROLLING THE PUMP



PUMP-BODY L

PUMP L

MELTING POT AND PUMP MECHANISM

14

17
18
19
20
21
22

PISTON
PUMP
M

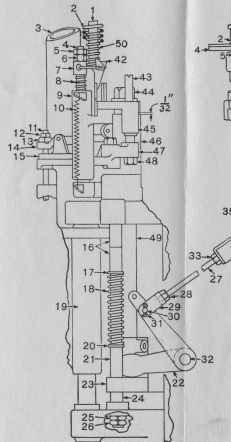


FIGURE 5
Mechanism for Operating, Adjusting,
and Controlling the Pump

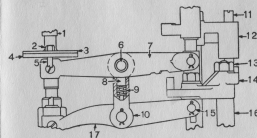


FIGURE 6
PUMP-BODY LEVERS and PISTON LEVERS

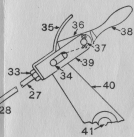


FIGURE 7
PUMP LATCH and GAG PLATES

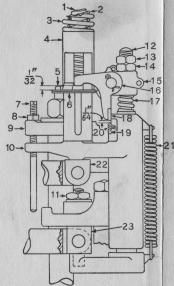


FIGURE 8
CROSS-HEAD STUD and PUMP
OPERATING LEVER

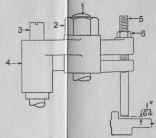


FIGURE 9
PISTON LEVER and PUMP
OPERATING LEVER

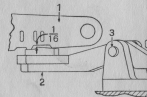
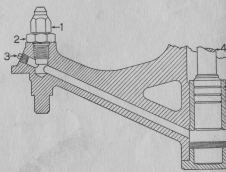


FIGURE 10
PUMP BODY, with PISTON, NOZZLE
VALVE, and PORT REGULATING



POT AND PUMP MECHANISM

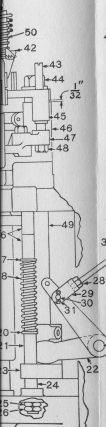


FIGURE 5
In for Operating, Adjusting,
Controlling the Pump

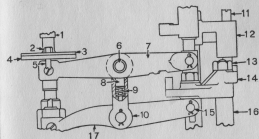


FIGURE 6
PUMP-BODY LEVERS and PISTON LEVERS

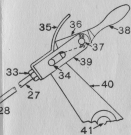


FIGURE 7
PUMP LATCH and GAG PLATES

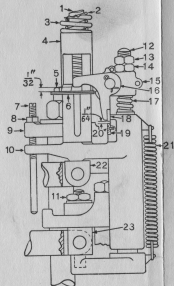


FIGURE 8
CROSS-HEAD STUD and PUMP
OPERATING LEVER

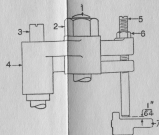


FIGURE 9
PISTON LEVER and PUMP
OPERATING LEVER

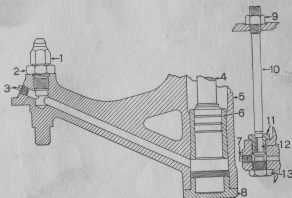


FIGURE 10
PUMP BODY, with PISTON, NOZZLE, INTAKE
VALVE, and PORT REGULATING SCREW

PLATE II

Figure 11

Part Sym- No. bol	Name
1 176F1	GUARD (left)
2 897F9	SCREW (2)
3 897F8	SPRING CLIP
4 177F1	GUIDE PLATE
5 177F2	COLLAR
6 29L1	COVERS
7 207E16	PAWL FINGER
8 179F1	STOP
9 178F4	HANDLE
10 178F2	BRACKET
11 178F6	FACING
12 178F1	ROLLER
13 178F3	SHAFT
14 176F2	GUARD (right)

Figure 12

Part Sym- No. bol	Name
1 162F1F	BRACKET
2 93F1	SUPPORTING BEAM
3 93F2	BOLTS (2)
4 178F1	GUARD (left)
5 95F2	BOLTS (2)
6 884F2	SHEAR BLADE GUIDE
7 83F2	SCREW (4)
8 885F5F	TUBE
9 97F7	SCREW (4)
10 968F7F	HANGER (left) (rear)
11 97F4F	HANGER (left) (front)
12 83F4	DOVEL
13 885F3	SHEAR BLADE
14 885F1	SHOE

Figure 13

Part Sym- No. bol	Name
1 93F2	BOLT (2)
2 93F1	SUPPORT BEAM
3 100F1	ROD
4 97F4F	HANGER (front) (left)
5 8101F6	BEARING
6 8101F1F	OPERATING LEVER
7 890F1F	TRANSFER BAR (rear)
8 897F1	TRANSFER BAR (front)
9 85F1	BLADE SHOE
10 891F2	ROCK SHAFT
11 891F5	LINK PIN (2)
12 891F4	LINK (2)
13 162F1F	MAIN BRACKET
14 102F1	ADJ. SCREW
15 102F2	ADJ. SCREW NUT
16 170F2	FULCRUM PIN
17 207E3	PAWL FINGER
18 207E8	SPRING POST

19 207E1E	PAWL
20 207E5	FULCRUM PIN
21 207E7	SPRING
22 8151F3	ADJ. SCREW
23 8151F4	LOCK NUT
24 162F3	SPRING PIN
25 171F2	PLATE (2)
26 171F1	SPRING
27 207E13	SPRING PIN
28 154F1	SCREW (2)
29 207E1E	CAM LAYER
30 8170F1F	SHEAR YOKE
31 162F1	PIN
32 8101F2	EXTENSION
33 8101F5	NUT
34 8101F4	ADJ. SCREW
35 151F2	STOP PIN
36 170F4	SPRING PIN

Figure 14

Part Sym- No. bol	Name
1 94F2	BOLT (2)
2 93F1	SUPPORTING BEAM
3 100F1	HANGER ROD
4 94F1F	BRACKET (right)
5 96F4	HANGER (rear) (right)
6 97F6	HANGER (front) (right)
7 96F5	SCREW (4)
8 106F1F	BAR (rod)
9 877F3	BAR SUPPORT
10 97F4F	SCREW
11 891F2	ROCK SHAFT
12 168F3	SPRING HOOK
13 168F1	SPRING
14 886F3	CLAMP (lower)
15 888F5	ADJ. NUT
16 175F1	FRICTION PLATE
17 175F2	SCREW
18 885F6	SPRING POST
19 108F2	PLATE (1)
20 88F1F	SHEAR GAGE
21 88F2	LOG
22 88U4	LINK PIN
23 886F1	CLAMP (upper)
24 88F3	LINK LATCH
25 889F1	SPRING
26 86F2	CLAMP SCREW
27 885F5F	SHOE TUBE

Figure 15

Part Sym- No. bol	Name
1 94F2	BOLT (2)
2 93F1	SUPPORTING BEAM
3 100F1	HANGER ROD
4 97F6	HANGER (right) (front)
5 96F4	HANGER (right) (rear)

6 94F1E	BRACKET (right)
7 96F5	SCREW (4)
8 87F1	GUIDE
9 87F2	SCREW (2)
10 87F1	CHANNEL BAR
11 891F2	ROCK SHAFT
12 175F2	SCREW
13 176F2	GUARD (right)

Figure 16

Part Sym- No. bol	Name
1 157F1F	ROCK SHAFT
2 158F1	SPRING
3 159F1	SCREW (2)
4 157F4	TOOTH
5 156F15F	CARRIER
6 156F6	BOLT (2)
7 156F7	WASHER (2)
8 156F4	WASHER
9 156F3	NUT
10 156F10	WASHER
11 156P9	SCREW
12 156F1F	BRACKET
13 156F2	BOLT
14 156F14	SHEAR BLADE
15 156F8	GUIDE
16 156F11	SHEAR BLADE (fixed)
17 156F12	ADJ. SCREW
18 156F13	SCREW
19 156F17	STOP SCREW
20 172F3	RIVET
21 172F2	SPRING
22 172F1F	BAR
23 172F8	RIVET (2)
24 878F5	GALLEY LEDGE
25 157F2	SHAFT ARM
26 207E5	FULCRUM PIN
27 207E13	FINGER
28 207E1E	LEVER
29 207E1E	PAWL
30 157F3	NUT
31 8170F1F	SHEAR YOKE
32 170F2	FULCRUM PIN
33 102F1	ADJ. SCREW
34 892F2	NUT
35 93F2	BOLT (2)
36 93F1	SUPPORTING BEAM
37 95F1F	BRACKET (left)
38 8160F1F	GALLEY PLATE
39 173F2	ADJ. SCREW
40 173F3	ADJ. SCREW
41 173F4	SCREW (4)
42 172F5	CLAMP
43 172F6	BOLT
44 172F4	SUPPORT
45 173F1	ADJ. STAND
46 207E8	SPRING POST
47 8207E15	SPRING
48 8207E4	SCREW

BRACKET (right)
SCREW (4)
GUIDE
SCREW (2)
CHANNEL BAR
LOCK SHAFT
SCREW
GUARD (right)

Figure 16

SADE
LOCK SHAFT
SPRING
SCREW (2)
TOOTH
CARRIER
ROCK (2)
WASHER (2)
WASHER
NUT
WASHER
SCREW
BRACKET
BOLT
REAR BLADE
GUIDE
REAR BLADE (Fixed)
D.I. SCREW
SCREW
TOP SCREW
LIVET
SPRING
AIR
PISTON (2)
VALLEY LEDGE
HAFT ARM
ULTRUM PIN
ENGINE
CYLINDER
AWL
NUT
REAR YOKER
ULTRUM PIN
D.I. SCREW
NUT
SCREW (2)
SUPPORTING BEAM
BRACKET (left)
VALLEY PLATE
D.I. SCREW
D.I. SCREW
LAMP
BOLT
SUPPORT
D.I. STAND
SPRING POST
SPRING
SCREW

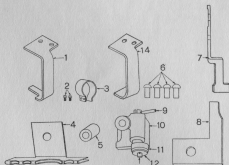


FIGURE 11
Miscellaneous Parts of Automatic Cutter

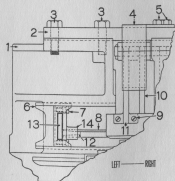


FIGURE 12
Left End of Automatic Cutter Showing Shear Parts

AUTOMATIC CUTTER AND

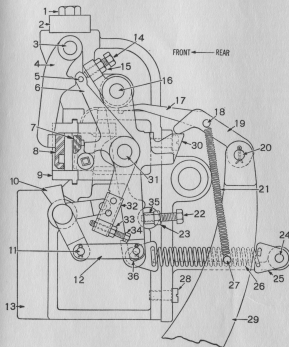


FIGURE 13
Automatic Cutter - Looking from Right End

CUTTER AND NON-FUSION STACKER

PLATE II
Figures 11 to 16
(Cutter and Stacker)

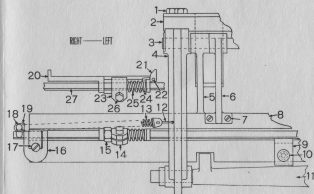


FIGURE 14
SHEAR GAGE for Setting Length of Cut
Rear View of Right End of CUTTER

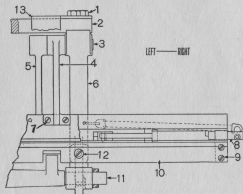


FIGURE 15
Right End of CUTTER—Front View

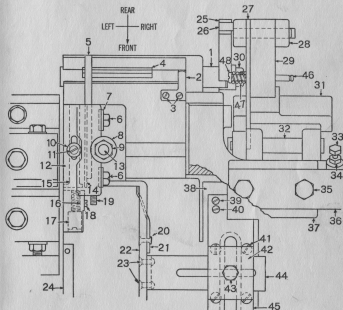


FIGURE 16
Non-fusion STACKER—Top View

Figure 17

Part Sym.	Name
No. bol	
1 237E6	ROD HEAD
2 237E10	ADJ. SCREW HEAD
3 237E11	LOCK NUT
4 237E9	ADJ. SCREW
5 237E5	ROD
6 237E7	LOCK NUT
7 237E3	Coupling SCREW
8 237E2	Coupling
9 237E4	WEDGE (2)
10 237E4	WEDGE (2)
11 237E1	ROD
12 237E15	STAND (top)
13 237E9	ADJ. SCREW
14 237E11	LOCK NUT
15 237E10	HEAD

Figure 18

Part Sym.	Name
No. bol	
1 230E1E	BELL CRANK
2 230E2	BUSHING

Figure 19

Part Sym.	Name
No. bol	
1 238E7	SCREW
2 238E6	CAP
3 231E1	ADJ. STUD
4 230E1E	BELL CRANK
5 238E5E	SOCKET
6 238E8	LOCK NUT
7 238E1E	ROD
8 238E3	LOCK NUT
9 238E2	ADJ. NUT
10 238E12	ABUTMENT
11 238E14	TUNE CAP
12 238E13	TUBE
13 231E4	CLAMP
14 231E6	NUT
15 238E15E	SOCKET
16 231E4	WASHER
17 232E3	NUT
18 232E1	STUD
19 274H12	Pipe (supply)
20 274H14	Pipe (drain)
21 274H3	Pipe (drain)

PLATE III

22 274H1	Pipe (supply)
23 68H9	SPRING CLIP
24 68H6H	HANDLE
25 238E16	CAP
26 238E7	SCREW (2)
27 238E1	FULCRUM PIN
28 234E3	BALL PIN

Figure 20

Part Sym.	Name
No. bol	
1 238E21	LOCK NUT (2)
2 238E20	NUT (2)
3 238E9	CAP
4 238E18	BALL
5 238E7	SCREW (2)
6 238E5E	SOCKET (rear)
7 238E8	NUT
8 238E1E	ROD
9 238E3	NUT
10 238E2	NUT
11 238E12	ABUTMENT
12 238E14	CAP
13 238E9	SPRING
14 238E10	SPRING
15 238E13	TUBE
16 238E11	ABUTMENT
17 238E4	HEAD
18 238E15E	SOCKET (front)
19 238E19	BALL
20 238E16	CAP
21 238E17	SCREW

Figure 21

Part Sym.	Name
No. bol	
1 63A4	ROD EYE
2 63A5	LOCK NUT
3 63A14	ABUTMENT
4 63A13	SLEEVE
5 63A15	SLEEVE (2)
6 63A6	SPRING
7 63A14	ABUTMENT (2)
8 63A3	SOCKET (rear)
9 63A6	NUT
10 63A1	ROD
11 63A7	LOCK NUT
12 63A2	SOCKET (front)
13 63A11	BALL EXTENSION

14 227E3	CLAMP SCREW
15 227E1E	CAM LEVER
16 232E34	CLOSURE
17 341E2	BRACKET
18 241E4	SPRING
19 241E3	BRACKET HEAD
20 234E6	NUT (graduated)
21 234E7	LOCK NUT
22 241E1	ROD
23 248E1	TUMBLER
24 240E1	CAM LEVER
25 242E1	SCREW (4)
26 248E6	TUMBLER LATCH
27 248E7	FULCRUM PIN
28 61A1	ROD
29 61A5	LOCK NUT
30 61A3	NUT
31 60A1	ADJ. SLEEVE
32 60A2	LOCK NUT
33 26A2	NUT (2)
34 55A1	BRIDGE
35 59A5	LOCK PIN
36 56A1	BRIDGE SUPPORT
37 59A2A	LINK (upper)
38 59A3	PIN (center)
39 59A1	LINK (lower)
40 58A1	PIN
41 252E64	WHEEL
42 252E39	ABUTMENT
43 252E2	NOZZLE SEAT
44 252E51	SHIELD
45 252E54	SCREW (4)
46	MATRIX
47 57A1A	MATRIX CARRIER
48 252E38	STOP PLATE
49 63A10	GUARD
50 59A6	COTTER
51 61A2	EYE

Figure 22

Part Sym.	Name
No. bol	
1 230E1E	BELL CRANK
2 237E1	ROD
3 237E15	STAND (top)
4 237E13	SCREW (5)
5 237E16	SCREW (6)
6 237E14	DOWEL (2)
7 237E2	Coupling
8 237E5	SCREW
9 237E12	STAND (bottom)

MOLD BLADE AND MATRIX OPER

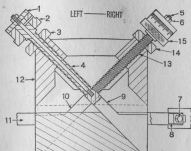


FIGURE 17
MICROMETER WEDGES

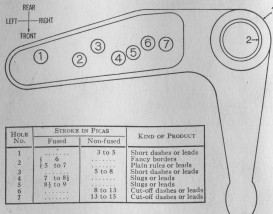


FIGURE 18
MOLD-BLADE BELL CRANK

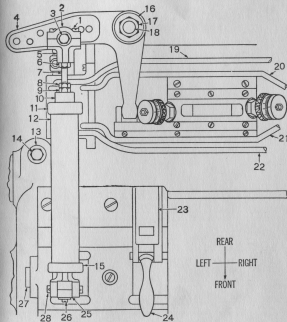


FIGURE 19
MOLD BLADE Operating and Setting Mechanism and Pump Control

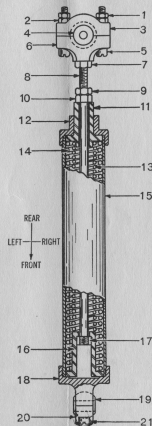


FIGURE 20
MOLD-BLADE Spring Box

MATRIX OPERATING MECHANISMS

PLATE III
Figures 17 to 22
(Mold Blade and Matrix
Operating Mechanisms)

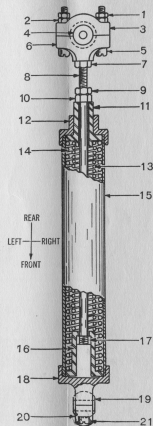


FIGURE 20
MOLD-BLADE SPRING BOX

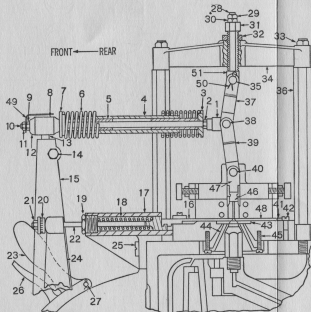


FIGURE 21
Cross Section Showing MATRIX Operating Mechanism, Mold
and Closure Mechanism

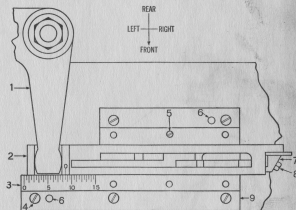


FIGURE 22
MOLD-BLADE OPERATING BAR and GAGE for Setting Stroke

Figure 23

Part No.	Sym.	Name
1	252E25	SCREW (4)
2	252E24	GAGE PLATE
3	252E18E	BOLSTER (rear)
4	252E42	BOLT (short) (2)
5	252E48	THRUST BAR (2)
6	252E45	BOLT (long) (2)
7	252E38	GUIDE (rear)
8	252E50	LOCK NUT (2)
9	252E49	ADJ. SCREW
10	252E29	SCREW (4)
11	252E59	ELBOW NUT (4)
12	252E18E	ELBOW
13	252E27	MOLD BLADE
14	231E2	COUPLING
15	231E3	SCREW
16	252E17	WASHER (4)
17	252E44	WASHER (4)
18	252E43	NUT (2)
19	252E42	BOLT (short) (2)
20	252E35E	GUIDE PLATE
21	252E47	WASHER (4)
22	252E45	BOLT (long) (2)
23	252E48	THRUST BAR (2)
24	252E40	CLOSURE SHOE
25	252E34	CLOSURE
26	252E41	SCREW (2)
27	252E28	GUIDE (front)
28	252E16	SCREW (4)
29	252E46	NUT (2)
30	252E36	GUIDE PLATE
31	252E14	PLUG SCREW
32	252E15	PLUG SCREW
33	252E18E	BOLSTER (front)
34	252E11	CLAMPING SCREW
35	252E62	ABUTMENT (2)
36	252E63	SCREW (4)
37	252E63	SCREW (4)
38	252E18E	BASE PLATE
39	252E59	ELBOW NUT (4)
40		POINT BLOCK (left)
41		POINT BLOCK (right)
42	252E59	ELBOW NUT
43	252E49	ADJ. SCREW
44	252E50	LOCK NUT

Figure 24

Part No.	Sym.	Name
1	252E18E	THRUST BAR (2)
2	252E18E	BOLSTER (rear)
3	252E49	ADJ. SCREW

PLATE IV

4	252E24	GAGE PLATE
5	252E19E	BOLSTER ELBOW
6	252E30	ABUTMENT
7	252E65	WEDGE
8	252E38	STOP PLATE
9	252E35E	GUIDE PLATE (left)
10	252E57	CLAMP SCREW
11	252E56	CLAMP
12	252E35	SCREW
13	252E53	SHIELD
14	252E54	SCREW (4)
15	252E16	SCREW (4)
16	252E42	BOLT (short) (2)
17	252E48	BOLSTER (front)
18	252E15	PLUG SCREW
19	231E2	COUPLING
20	252E1E	BASE PLATE

Figure 25

Part No.	Sym.	Name
1	252E11	SPRING ROO
2	252E10	SPRING (outer)
3	13H	CHIMNEY
4	3119	STOP
5	5011	SPRING
6	1913	CROSSHEAD (upper)
7	58H1	ABUTMENT
8	29H	LEVER
9	29H3	STAND
10	3119	STOP NUT
11	274H2	PIPE (supply)
12	274H4	PIPE (drain)
13	274H3	PIPE (drain)
14	274H1	PIPE (supply)
15	7415	WATER COCK (2)
16	66H1	BRACKET
17	66H7	TEE
18	311H14	SPRING
19	352E1	PULLEY
20	200E4	SHAFT NUT
21	200E1E	SHAFT
22	267H1	BELL CRANK
23	210H8	CROSSHEAD (lower)
24	230H	RAIL
25	311H3	STOP NUT (2)
26	311H3	STOP NUT (2)
27	227E1E	CAM LEVER
28	68H9	SPRING CLIP
29	268H36	PIN
30	68H2	IRON EYE (front)
31	234E1E	CAM LEVER
32	247E1E	CAM LEVER

33	68H1	ROO
34	223E1	FULCRUM PIN
35	202E1	SCREW (8)
36	202E1	STAND
37	220E1	CAM SHAFT
38	204E7	KEY (long)
39	224E5E	ROLLER
40	69H1	SHAFT

Figure 26

Part No.	Sym.	Name
1	255E1	INDEX PLATE
2	255E2	SCREW (2)

Figure 27

Part No.	Sym.	Name
50	c14H10	NOZZLE No. 50
47	c14H21	NOZZLE No. 47
43	d14H22	NOZZLE No. 43
8	c14H24	NOZZLE No. 8
7	c14H23	NOZZLE No. 7
5	c14H17	NOZZLE No. 5
4	c14H19	NOZZLE No. 4
..	a14H12	LOCK NUT

Figure 28

Part No.	Sym.	Name
.....		CUT-OFF DASH MATRIX

Figure 29

Part No.	Sym.	Name
1	a25L1	GAGE (Standard)
..	a25L2	GAGE (Longtype)
.....		PUSHON MATRIX
.....		NON-PUSHON MATRIX

MOLD, NOZZLES, AND GENERAL

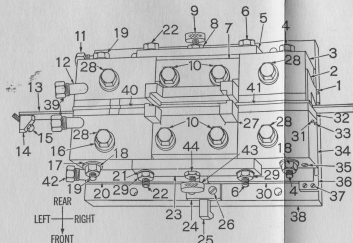


FIGURE 23
MOLD-HOLDER BASE PLATE Assembly with MOLD

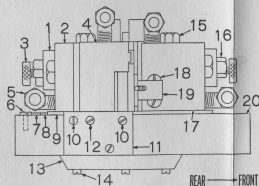


FIGURE 24
MOLD-HOLDER BASE PLATE Assembly with MOLD—Left End View

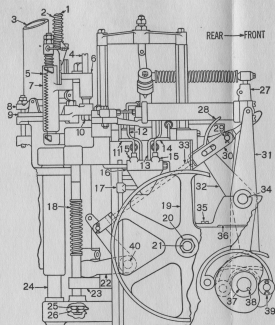


FIGURE 25
General Operating Mechanism—Left End View

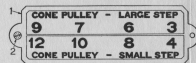


FIGURE 26
INDEX PLATE

AND GENERAL OPERATING MECHANISM

PLATE IV
Figures 23 to 29
(Mold, Nozzles, and General
Operating Mechanism)

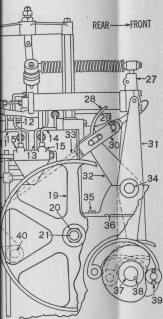


FIGURE 25
Operating Mechanism—Left End View

ALLEY - LARGE STEP			
7	6	3	
10	8	4	
ALLEY - SMALL STEP			

FIGURE 26
INDEX PLATE

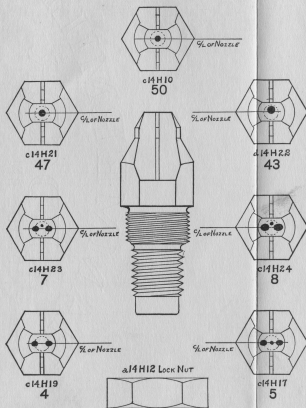


FIGURE 27
NOZZLES—Nos. 50, 47, 43, 7, and 8 Are Furnished with
Equipment—Nos. 4 and 5 Are Special

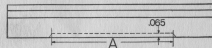


FIGURE 28
Cut-off Dash MATRIX

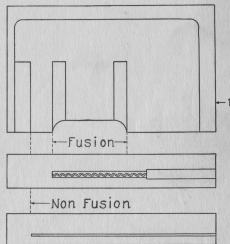


FIGURE 29
Mold Blade Cage
Fusion MATRIX and Non-fusion MATRIX

PLATE V

Figure 30

Part Sym- No. bcl	Name
.. 15H	SQUARING PIN (early Pump)

Figure 31

Part Sym- No. bcl	Name
.. 26H	ROD
.. 26H4	NUT (3)
.. 26H5	LOCK NUT (2)
.. 26H	LEVER

Figure 32

Part Sym- No. bcl	Name
B ..	NOZZLE (See Fig. 27)
C 251E2	NOZZLE SEAT

Figure 33

Part Sym- No. bcl	Name
C 012H	CASING
.. 12H8	SCREW

.. a12H10	NUT (2)
.. a37H9	SCREW
.. a37H10	SCREW (2)

Figure 34

Part Sym- No. bcl	Name
1 198E1	BASE
2 199E2	PULLEY ARM
3 b199E1E	PULLEY
4 b199E3	PULLEY STUD
5 ..	MOTOR
6 243E6	BOLT (4)
7 243E7	WASHER (4)
8 a243E1	BASE BLOCK
9 243E5	WASHER (4)
10 a243E3	BOLT (2)
11 199E4	NUT
12 a199E6	BUSHING
13 271L	MOYOR PULLEY
14 271L3	SET SCREW
15 243E4	NUT (4)

Figure 35

INSTALLATION PLAN

Figure 36

Part Sym- No. bcl	Name
.. b199E1E	PULLEY (Idler)
.. b199E3	STUD
.. a199E6	BUSHING
.. 200E1	SPRING
.. a200E2	EXTENSION
.. 271E1	PULLEY (Intermediate)
.. 277E2	BRACKET
.. 277E3	BUSHING
.. 277E4	SPROCKET
.. 277E6	STUD
.. 278E1E	PULLEY (Motor)
.. 278E1	SPROCKET
.. 279E1	CHAIN
.. a69H12	FULCRUM PIN

EARLY PUMP—INSTALLATION PLAN

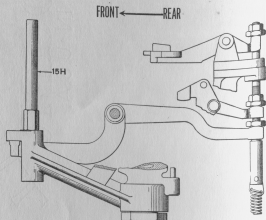


FIGURE 30
NOZZLE SQUARING PIN (Early Pump)

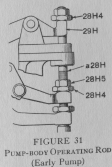


FIGURE 31
PUMP-BODY OPERATING ROD
(Early Pump)

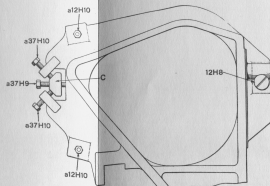


FIGURE 33
SWING FRAME TABLE (Early Pump)

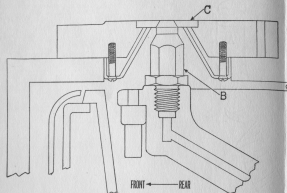
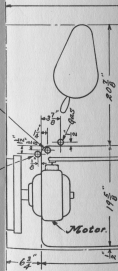


FIGURE 32
NOZZLE AND NOZZLE SEAT

Drain.
1/2" female connection
pointing down
31 1/2" above floor.

REAR
LEFT → RIGHT
FRONT

Water.
1/2" female connection
pointing to rear
33 1/2" above floor.



EARLY PUMP—INSTALLATION PLAN—SPEED REDUCING DEVICE

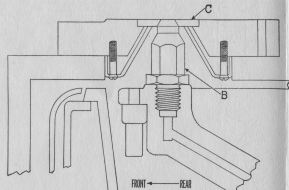


FIGURE 32
NOZZLE and NOZZLE SEAT

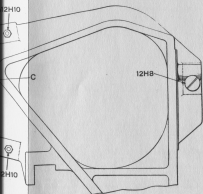


FIGURE 33
WING FRAME TABLE (Early Pump)

Drain.
 $\frac{1}{2}$ " female connection
pointing down
 $3\frac{1}{2}$ " above floor.

REAR
LEFT → RIGHT
FRONT

Water.
 $\frac{1}{2}$ " female connection
pointing to rear
 $33\frac{1}{2}$ " above floor.

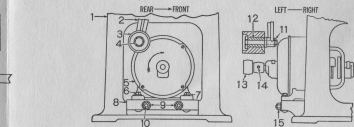


FIGURE 34
MOTOR and IDLER

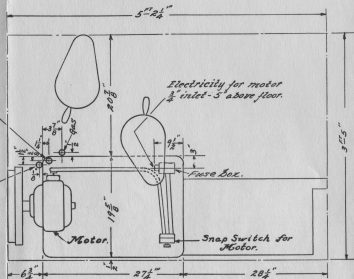


FIGURE 35
INSTALLATION PLAN

a69H2

b199E1
b199E3
a199E6
277E2
277E6
277E3
277E1
277E4

